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Staff Report

Applicant: De Beers Canada Inc. – Gahcho Kué Project	
Location: Kennady Lake, NT	File Number(s): MV2005L2-0015
Date Prepared: May 6, 2021	Date of Board Meeting: May 13, 2021
Subject: Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, and L (Version 4)	

1. Purpose

The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board) the Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, and L (Plan) Version 4 submitted by De Beers Canada Inc. (De Beers) to fulfill Part G, Condition 16 of Water Licence (Licence) MV2005L2-0015.

2. Background

- September 24, 2014 – Issuance of Licence MV2005L2-0015;
- March 27, 2015 – De Beers submits the Plan (Version 1);
- May 26, 2015 – The Board conditionally approves the Plan (Version 1);
- May 27, 2015 – De Beers submits an updated Plan (Version 2) and written confirmation of conformity from Board staff was issued;
- April 17, 2017 – De Beers submits an updated Plan (Version 3) with amendment #2 application to Land Use Permit (Permit) MV2005C0032;
- June 7, 2017 – The Board interim approved the Plan (Version 3);
- January 22, 2021 – The updated Plan (Version 4) received;
- March 11, 2021 – Plan review commenced;
- April 1, 2021 – Comments and recommendations due and received;
- April 8, 2021 – Responses due and received; and
- **May 13, 2021 – The Plan, Version 4, presented to the Board for decision.**

3. Discussion

Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, and L History

During the initial regulatory process of the Licence application, in 2014, concerns were raised that the level of detail provided for dyke construction was insufficient for the comprehensive construction process, design, monitoring, action levels, mitigation activities, and reporting protocols associated with the development of these structures. On August 11, 2014, the Board included a condition in the Licence

relating to the Dyke Construction and Management Plan to ensure that effects to the receiving environment, mostly relating to erosion and sedimentation, were minimized. Part G, Condition 16 states:

“All other dykes shall be addressed under the **Dyke Construction and Management Plan**, which shall be submitted to the Board for approval sixty (60) days prior to commencement of Construction of any dykes other than Dyke A. This Plan shall meet the objectives listed in Part G, Condition 1, and satisfy the requirements of Schedule 5, Condition 8. This Plan shall address the Construction and Operation phases of the Project. The Licensee shall not commence Construction of these remaining dykes until the Board has approved the Plan.”

De Beers submitted the Plan (Version 1) on March 27, 2015 as was required under the Licence. A total of 14 dykes will be constructed during the life of the mine. This Plan covers the construction of 8 of these (Dykes A1, F, G, H, I, J, K, and L). The remaining Dykes (Dykes A, B, D, E, M, and N) will be covered under separate cover as the detailed design process is developed. The Board conditionally approved the Plan (Version 1) on May 26, 2015.

On May 27, 2015, De Beers submitted an updated Plan (Version 2) to address the comments received during the review of Version 1 and written confirmation of conformity from Board staff was issued.

On April 17, 2017, Version 3 of the Plan was submitted with the amendment #2 application package to Permit MV2005C0032 to address an expansion of the Fine Processed Kimberlite Containment Facility, which included an increase to Dykes A1 and L.

On January 22, 2021, De Beers submitted an updated Plan (Version 4) to incorporate the updated design revisions to Dykes A1 and L (attached).

4. Comments

Not applicable.

5. Public Review

By April 1, 2021, comments and recommendations on the Plan were received from three Parties:

- Environment and Climate Change Canada (ECCC)
- Government of the Northwest Territories – Department of Environmental and Natural Resources (GNWT-ENR)
- Government of the Northwest Territories – Department of Lands – Inspector

De Beers responded by April 8, 2021. The Review Summary and Attachments (attached) presents the concerns identified through this review.

Main Issues Raised during the Review

The following summarizes the main issues raised during the review:

- *Total Suspended Solids*

ECCC (Comment IDs 2, 3, 4, 5) requested that De Beers provide further information as it relates to the TSS/turbidity regression curve. In response, De Beers provided additional details and clarifications as to the current phase they are in and that at this time, and that any water accumulated would be contained

within the controlled area (not discharged to the receiving environment). Board staff recommend that De Beers ensure the current TSS-Turbidity relationship remains valid and should future construction work be required, an update to the Dyke Construction and Management Plan would be required.

- *Administrative Updates*

GNWT-ENR (Comment IDs 2, 3) noted inconsistencies and sought clarification from De Beers. In response, De Beers provided additional details and clarifications. Board staff recommend that De Beers should update this information for consistency in the document in the next iteration of this Plan or to provide the requested details in the Annual Water Licence Report.

6. Security

The status of security for this Project will not be affected by the Board's decisions related to the Plan.

7. Conclusion

Board staff conclude that further information was provided by De Beers in their responses to comments and recommendations; however, based on the public review, Board staff conclude that the Board could approve the Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, and L, Version as submitted, and to include direction to De Beers on what to include in the next iteration of the plan.

8. Recommendation

Board staff recommend the Board **make a motion to approve the Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, and L, Version 4 as required by Water Licence MV2005L2-0015 as submitted.**

A draft decision letter is attached.

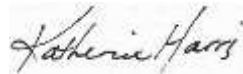
9. Attachments

- [Dyke Construction Management Plan Dykes A1, F, G, H, I, J, K, and L \(Version 4\)](#)
- Review Summary and Attachments
- Draft Decision Letter from the Board

Respectfully submitted,



Angela Love
Regulatory Specialist



Katherine Harris
Technical Advisor

Review Comment Table

Board:	MVLWB
Review Item:	Gahcho Kue - Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, and L (Version 4) (MV2005L2-0015)
File(s):	MV2005L2-0015
Proponent:	De Beers Canada Inc - Gahcho Kue
Document(s):	Dyke Construction Management Plan Dykes A1, F, G, H, I, J, K, and L (V.4) (24.05 MB)
Item For Review Distributed On:	Mar 11 at 14:40 Distribution List
Reviewer Comments Due By:	Apr 1, 2021
Proponent Responses Due By:	Apr 8, 2021
Item Description:	<p>De Beers Canada Inc. (De Beers) has submitted Version 4 of its Dyke Construction Management Plan Dykes A1, F, G, H, I, J, K, and L (Plan) on January 22, 2021. This Plan is required by Licence MV2005L2-0015, Part G, condition 16.</p> <p>Proposed changes include, but not limited to:</p> <ul style="list-style-type: none"> • Edits throughout the document to update design revision for Dykes A1 and L. • Updated to address the 2020 amendment application (including changes to monitoring SNP stations in Table 6 and in Figure 4), which was approved by the GNWT-ENR Minister March 10, 2021. • Updated Appendices A, B, and L. <p>Refer to the Revision History table included in the Plan for a more comprehensive list of proposed changes provided by De Beers.</p> <p>Using the Online Review System (ORS), reviewers are invited to submit comments and recommendations on the documents linked below by the review comment deadline specified. Reviewers may also wish to consider providing an overarching recommendation regarding whether the Board should approve the submission, to provide context for the comments and recommendations and assist the Board with its decision. If reviewers seek clarification on the submission, they are encouraged to correspond directly with De Beers prior to submitting comments and recommendations.</p> <p>All documents that have been uploaded to this review are also available on our Public Registry. If you have any questions or comments about the ORS or this review, please contact Board staff identified below.</p>
Contact Information:	<p>Angela Love 867-766-7456 Jacqueline Ho 867-766-7455 Katherine Harris</p>

Comment Summary

Environment and Climate Change Canada: Jennifer Sabourin				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Decision
1	Cover Letter	Comment (doc) N/A Recommendation N/A	Apr 8: N/A	Noted.
2	Topic: Total Suspended Solids (TSS)/turbidity monitoring Reference:Gahcho Kue - Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, and L (Version 4) (dated January 2021)	<p>Comment As indicated in Section 4 and the Figure 4 footnote, TSS will be measured using turbidity as a real-time surrogate. Section 4.2 (Total Suspended Solids-Turbidity Measurement) states that field measurements of TSS are taken using an instrument (Hach DR-900) which directly reports TSS values. ECCC notes that the relationship between suspended solids and turbidity is unique to each instrument and each construction site. A TSS/turbidity regression curve is typically developed to determine a site-specific relationship, and used to correlate turbidity readings and TSS concentrations. However, the Dyke Construction and Management Plan does not indicate whether a TSS/turbidity regression curve would be used to support the interpretation of turbidity readings.</p> <p>Recommendation ECCC provides the following recommendations:</p> <ul style="list-style-type: none"> • Develop a TSS/turbidity regression curve to establish the site-specific correlation between turbidity readings and TSS concentrations; • Conduct periodic confirmation/calibration of the TSS-turbidity regression; • Validate onsite TSS surrogate measurements with concurrent TSS laboratory analyses; and 	<p>Apr 8: The Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, L were initially submitted in 2015, prior to the start of mining operations; and it includes plans for seven dykes, some of which have already been completed. During the current update, only sections that are relevant to the raising of Dyke A1 and L are updated. Therefore, some sections that are only relevant to other dykes or relevant to early stage of the mine construction were not updated. De Beers developed the site-specific TSS-Turbidity relationship based on the monitoring data during the initial dewatering and construction period in 2014 and 2015. The technical memo describing the TSS-Turbidity relationship was attached as Appendix E in the Final Detailed Construction Plan Dyke Construction Management Plan Water Collection Ponds (Version 2). The document can be found at: http://registry.mvlwb.ca/Documents/MV2005L2-0015/MV2005L2-0015%20-%20De%20Beers%20Gahcho%20Kue%20-%20Dyke%20Construction%20and%20Management%20Plan%20-</p>	<p>Noted.</p> <p>It is understood that:</p> <ol style="list-style-type: none"> a) the TSS-Turbidity relationship was last updated in 2016, b) the site is currently in operations, but construction is still ongoing, c) that water accumulated in the working area for Dyke A1 will be pumped back to the Fine PK Containment, and d) Dyke L is a filter dyke and it's expected that they'll be no water accumulated. <p>The Board requires De Beers to ensure that the TSS-Turbidity relationship remains valid.</p>

		<ul style="list-style-type: none"> Incorporate the above details in the Dyke Construction and Management Plan. 	<p>%20Water%20Collection%20Ponds%20-%20v.2%20-%20Aug%2011_16.pdf</p> <p>In 2016, additional data, collected during the construction of dykes F,G,L and A1 were analyzed to update the TSS-Turbidity relationship. The developed correlation for Gahcho Kue is $TSS=1.55*NTU$. However, this correlation only applies to discharge monitoring during the construction phase according to the Water Licence Annex A: Surveillance Network Program, Part G, Item 3 and Schedule 5, item 1-c. The Gahcho Kué Mine is now in the operational phase of mining, though construction of various dykes and facilities will continue throughout the life of mine. During the operational phase, De Beers is currently using Hach DR-900 as the primary field measurements of TSS in the field. The instrument directly reports TSS values. In addition, in practice, water accumulated in the working area for Dyke A1 construction will be pumped back to the Fine PK Containment. Since Dyke L is a filter dyke, no water accumulation is expected. Therefore, no TSS measurement is required. De Beers does not agree with the recommendation to update Section 4 as per the response above,</p>	
3	<p>Topic: Standard Operation Procedures for Monitoring and Management Reference:Section 4.5 (Standard Operation</p>	<p>Comment Bullet 4 of Section 4.5 (Standard Operation Procedures for Monitoring and Management) states: "If TSS levels (or turbidity as a surrogate) in a single sample exceeds the MGC [Maximum Grab Concentration] of the</p>	<p>Apr 8: See ECCC #2, that section was to address sediment/TSS concerns in early stage of the construction. At the time, the "monitoring locations" were referring to the locations in Table 6, and the "actions"</p>	<p>Noted that De Beers' response to ECCC-2 has indicated that no water will be released to the receiving environment in relation to the current Dyke A1 and Dyke L construction</p>

	Procedures for Monitoring and Management)	<p>action level in Table 6, this will trigger a series of response actions...” However, it is unclear which monitoring location(s) this statement refers to, and what response actions would be taken if more than a single sample exceeds the MGC of the action level.</p> <p>Recommendation ECCC provides the following recommendations for bullet 4 of Section 4.5 (Standard Operation Procedures for Monitoring and Management):</p> <ul style="list-style-type: none"> • Update Bullet 4 to specify which monitoring location(s) this statement refers to; and • State what actions are triggered if the MGC of the action level in Table 6 is exceeded in more than a single sample. 	<p>were referring the three bullets under Section 4.5, subsection 4. De Beers recommends Section 4 is not required to be updated, as it's only applicable for the early stage of the dyke construction.</p>	<p>(i.e., all water is either pumped back and managed within the controlled area water management system or no water will accumulate). If future construction work is required, an update to the Dyke Construction and Management Plan would be required and if additional water quality monitoring for TSS was necessary, an update to this plan to incorporate relevant monitoring locations and response actions could be developed for Board approval at that time.</p>
4	<p>Topic: Station SNP 17 - Standard Operation Procedures Reference:Section 4.5 (Standard Operation Procedures for Monitoring and Management)</p>	<p>Comment Bullet 5 of Section 4.5 (Standard Operation Procedures for Monitoring and Management) states: “As monitoring continues, the MAC [Maximum Average Concentration] TSS concentrations for each station will be calculated. Should the MAC of the action levels in Table 6 be exceeded at the SNP 17 location, De Beers will stop construction, advise the regulators, and take the following actions...” However, Figure 4 (Standard Operating Procedure for Monitoring and Management of Total Suspended Solids during Dyke Construction) does not appear to incorporate the described response actions (i.e., stop construction, advise the regulators, et cetera). Section 4.5 should also state what action would be triggered if the MGC of the action level in Table 6 is exceeded at Station</p>	<p>Apr 8: Same as ECCC #3</p>	<p>See ECCC-2 and ECCC-3.</p>

		<p>SNP 17. ECCC notes that Dyke A1 abuts Lake A1 for about 200 metres. Given that TSS/turbidity appears to be sampled only once per day, Lake A1 should be protected by conservative response actions should any sample exceed the MGC of the action level in Table 6 at Station SNP 17.</p> <p>Recommendation ECCC provides the following recommendations:</p> <ul style="list-style-type: none"> • Update Section 4.5 (Standard Operation Procedures for Monitoring and Management) to specify what actions would be triggered if the MGC of the action level in Table 6 is exceeded at Station SNP 17; and • Review and revise Figure 4 (Standard Operating Procedure for Monitoring and Management of Total Suspended Solids during Dyke Construction) to indicate what actions would be triggered in the event that the (i) MGC and (ii) MAC of the action level in Table 6 is exceeded at Station SNP 17, ensuring the response actions agree with the actions described in Section 4.5 		
5	<p>Topic: Quality Assurance/Quality Control (QA/QC) samples Reference:Section 4.6 (Quality Assurance/Quality Control for Total Suspended Solids Monitoring)</p>	<p>Comment Section 4.6 (Quality Assurance/Quality Control for Total Suspended Solids Monitoring) discusses internal laboratory QC samples, but does not include field QA/QC samples nor travel blanks.</p> <p>Recommendation ECCC recommends that Section 4.6 (Quality Assurance/Quality Control for Total Suspended Solids Monitoring) be updated to</p>	<p>Apr 8: Same as ECCC #2 and 3. TSS monitoring is not required as any water in the construction area will be pumped to the FPK Containment Area. QA/QC procedures for all other sampling activities will follow the approved QA/QC Plan.</p>	<p>See ECCC-2 and ECCC-3</p>

		incorporate duplicate field samples, field blanks, and travel blanks.		
6	Topic: Figure 4 Reference: Figure 4 (Standard Operating Procedure for Monitoring and Management of Total Suspended Solids during Dyke Construction)	Comment Figure 4 (Standard Operating Procedure for Monitoring and Management of Total Suspended Solids during Dyke Construction) should include a reference to Action Levels for both SNP 01 and SNP 02. Recommendation ECCC recommends that Figure 4 (Standard Operating Procedure for Monitoring and Management of Total Suspended Solids during Dyke Construction) be updated to clarify that 'MAC' and 'MCG' in boxes SNP 01 and SNP 02 refer to Table 6 Action Levels.	Apr 8: The action levels for TSS were referred to Table 6 as stated in Figure 4 "As per Table 6" in the Boxes SNP01 and SNP02.	Noted. Cross-references for the Table 6 and Figure 4 are complete and no further adjustments appear to be necessary at this time.
GNWT - ENR - EAM (Environmental Assessment and Monitoring): Central Email GNWT				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Decision
4	General File	Comment (doc) ENR Letter with Comments and Recommendations Recommendation		Noted.
1	Topic: Discharge	Comment Section 3.7 references water discharge from Kennady Lake to the receiving environment. While ENR understands that this may be a remnant from the original Dyke Construction Plan and activities, it isn't clear if any work related to remaining construction activities would require discharge from Kennady Lake (or the Water Management Pond) to the receiving environment. Recommendation 1) ENR recommends that De Beers clarify whether any further discharge from Kennady Lake (or the Water Management Pond) is required related to future dyke construction.	Apr 8: As GNWT pointed out the section includes the verbiage for the early construction stage, De Beers would like to clarify that Kennady Lake dewatering was complete in 2016 to facilitate the initial dyke construction. Any discharge from the Water Management Pond is related to operational discharge under the Operational Water Management Plan, not related to dyke construction.	Noted. It is understood that any discharge that occurs now, from the Water Management Pond, is not related to Dyke construction.
2	Topic: SNP 3 and 4	Comment ENR notes that De Beers have removed SNP	Apr 8: Agreed.	Noted.

		<p>stations 3 and 4 from Table 6 and Figure 4 as discharge to Area 8 is no longer permitted; however, it was noted that the SNP stations were still present in Figure 2.</p> <p>Recommendation 1) ENR recommends that in future versions of the plan, SNP stations 3 and 4 are removed from Figure 2.</p>		<p>In the next iteration of this plan, De Beers to ensure all information reflects currently approved activities (ex. updating Figure 2 to remove reference to obsolete SNP stations).</p>
3	Topic: In-Water Works	<p>Comment Section 4 states that additions to Dyke L will be limited to an increase in height on top of current footprint or on land. It was ENR's understanding that at some point, Dyke L was to be expanded further into the Water Management Pond; however, this work may have been completed previously related to another amendment process and mine plan update.</p> <p>Recommendation 1) ENR recommends that De Beers clarify the extent of the increased footprint that will be required to Dyke L, and summarize the work that has been completed on Dyke L to date, specifically to increases of the footprint into the Water Management Pond.</p>	<p>Apr 8: As per the redesign of Dyke L presented in the Dyke Construction Management Plan V4, the further raise of Dyke L will be limited to the as-built footprint in water and no further extension to the WMP is required.</p>	<p>It is understood that the latest extension to Dyke L was to accommodate a raise. A previous amendment request, processed in 2018, requested an expansion of the footprint into the Water Management Pond.</p> <p>Noted that the design plans submitted with this updated plan account for the previously requested footprint expansion (as seen in the figure titled 'dyke l at crest elevation of 429.8 m plan view' in Appendix I of the Plan).</p> <p>Also noted that a summary of all construction activities related to the Dyke Construction and Management Plan are to be included in the Annual Water Licence Report. De Beers shall ensure all work completed is summarized as part of this submission requirement.</p>
GNWT - Lands - North Slave Region: Joseph Heron				
ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Decision

1	GK - Dyke Construction & Mgt. Plan v.4	Comment The Inspector has reviewed the document and has no comment. Recommendation None.	Apr 8: De Beers appreciates the inspector's review.	Noted.
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Environmental Protection Operations Directorate
Prairie & Northern Region
5019 52nd Street, 4th Floor
P.O. Box 2310
Yellowknife, NT X1A 2P7

ECCC File: 5100 000 013/007
MVLWB File: MV2005L2-0015



Thursday April 1, 2021

via online review system

Shelagh Montgomery
Executive Director
Mackenzie Valley Land and Water Board
7th Floor, 4922 48th Street
P.O. Box 2130
Yellowknife, NT X1A 2P6

Dear Shelagh Montgomery:

RE: MV2005L2-0015 # – De Beers Canada Inc.– Gahcho Kue – Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, and L (Version 4)

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Mackenzie Valley Land and Water Board (MVLWB) regarding the above mentioned Dyke Construction and Management Plan for Dykes A1, F, G, H, I, J, K, and L (Version 4). This letter and the attached comments provides ECCC's specialist advice based on our mandate pursuant to the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act*.

If you need more information, please contact Jennifer Sabourin at Jennifer.Sabourin@Canada.ca.

Sincerely,

Jennifer Sabourin
Environmental Assessment Officer

Attachment(s): ECCC Comments Excel Sheet

cc: Jody Small, Acting Head, Environmental Assessment North (NT and NU)





April 1, 2021

Jacqueline Ho
Regulatory Specialist
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O. Box 2130
Yellowknife, NT
X1A 2P6

Dear Ms. Ho,

**Re: DeBeers - Gahcho Kue
Water Licence – MV2005L2-0015
Dyke Construction and Management Plan
Dykes A1, F, G, H, I, J, K, and L - Version 4
Request for Comment**

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories has reviewed the plan at reference based on its mandated responsibilities under the *Waters Act* and provides the following comments and recommendations for the consideration of the Board.

Topic: Discharge

Comment(s):

Section 3.7 references water discharge from Kennady Lake to the receiving environment. While ENR understands that this may be a remnant from the original Dyke Construction Plan and activities, it isn't clear if any work related to remaining construction activities would require discharge from Kennady Lake (or the Water Management Pond) to the receiving environment.

Recommendation(s):

- 1) ENR recommends that De Beers clarify whether any further discharge from Kennady Lake (or the Water Management Pond) is required related to future dyke construction.

Topic: SNP 3 and 4**Comment(s):**

ENR notes that De Beers have removed SNP stations 3 and 4 from Table 6 and Figure 4 as discharge to Area 8 is no longer permitted; however, it was noted that the SNP stations were still present in Figure 2.

Recommendation(s):

- 1) ENR recommends that in future versions of the plan, SNP stations 3 and 4 are removed from Figure 2.

Topic: In-Water Works**Comment(s):**

Section 4 states that additions to Dyke L will be limited to an increase in height on top of current footprint or on land. It was ENR's understanding that at some point, Dyke L was to be expanded further into the Water Management Pond; however, this work may have been completed previously related to another amendment process and mine plan update.

Recommendation(s):

- 1) ENR recommends that De Beers clarify the extent of the increased footprint that will be required to Dyke L, and summarize the work that has been completed on Dyke L to date, specifically to increases of the footprint into the Water Management Pond.

Comments and recommendations were provided by ENR technical experts in the Water Management and Monitoring Division and were coordinated and collated by the Environmental Assessment and Monitoring Section (EAM), Environmental Stewardship and Climate Change Division.

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email patrick.clancy@gov.nt.ca.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Clancy', written in a cursive style.

Patrick Clancy
Environmental Regulatory Analyst
Environmental Assessment and Monitoring Section
Environmental Stewardship and Climate Change Division
Department of Environment and Natural Resources
Government of the Northwest Territories