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July 9, 2025

File: W2020L8-0003

Dawn Keim,
A/Senior Manager
Crown-Indigenous Relations and Northern Affairs Canada – Contaminants and Remediation Division
P.O. Box 1500 4923-52nd St
Yellowknife, Northwest Territories, X1A 2R3

Sent by email

Dear Dawn,

Re: AEMP Response Framework for TSS and Turbidity - Kwetìḡaà (Rayrock) Remediation Project - Miscellaneous - Former Rayrock Mine, NT

The Wek'èezhìi Land and Water Board met on July 9, 2025, and considered the Aquatic Effects Monitoring Program (AEMP) Response Framework for Total Suspended Solids (TSS) and Turbidity¹ submitted by Crown-Indigenous Relations and Northern Affairs Canada – Contaminants and Remediation Division (CIRNAC-CARD) on May 16, 2025, as required by the Board's Reasons for Decision for the Project's Water Licence Amendment (Decision #10).²

As explained in the attached Reasons for Decision, the Board has decided to approve the AEMP Response Framework for TSS and Turbidity with revisions 1 and 2 as detailed in the Reasons for Decision. The Board has provided direction for submission of an updated AEMP Design Plan within 30 days of receiving this Decision.

Please direct questions or concerns regarding this letter to Ryan Fequet in writing.

¹ See WLWB (www.wlwb.ca) Online Registry for [Rayrock - AEMP Response Framework – TSS and Turbidity - May 16 25](#).

² See WLWB Online Registry for [Rayrock – WL Amendment – Reasons for Decision – Feb 26 25](#).

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Mason Mantla', with a stylized, cursive script.

Mason Mantla
Chair, Wek'èezhìi Land and Water Board

Bcc'd to: Rayrock Distribution List
Attached: Reasons for Decision



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Reasons for Decision

Reference/File Number:	W2020L8-0003 (Type "A" Water Licence)
Licensee:	Crown-Indigenous Relations and Northern Affairs Canada Contaminants and Remediation Division (CIRNAC-CARD)
Subject:	Aquatic Effects Monitoring Plan (AEMP) Response Framework for Total Suspended Solids (TSS) and Turbidity.

Decision from the Wek'èezhìi Land and Water Board Meeting of July 9, 2025

1.0 Decision

On July 9, 2025, the Wek'èezhìi Land and Water Board (WLWB or the Board) met and considered Crown-Indigenous Relations and Northern Affairs Canada – Contaminants and Remediation Division's (CIRNAC-CARD) Aquatic Effects Monitoring Program (AEMP) Response Framework for Total Suspended Solids (TSS) and Turbidity¹ required by the Board's Reasons for Decision for the Project's Water Licence Amendment (Decision #10).² In consideration of the submission, previous Board direction, reviewer comments, and proponent responses, the Board has made the following decisions:

1. Approve the AEMP Response Framework for TSS and Turbidity and the updated map showing the locations of SNP Stations 1663-14 and 1663-15;
2. Require CIRNAC-CARD to submit the updated AEMP Design Plan to include the Response Framework for TSS and Turbidity, the updated map, and Revisions 1 and 2 for Board staff conformity. The updated version of the AEMP Design Plan is to be submitted within 30 days of receiving this Decision; and
3. Require CIRNAC-CARD to assess the TSS-turbidity relationship as part of the 2025 AEMP Annual Report to confirm that the use of the CCME 3:1 ratio remains valid.

¹ See WLWB (www.wlwb.ca) Online Registry for [Rayrock - AEMP Response Framework – TSS and Turbidity - May 16 25](#).

² See WLWB Online Registry for [Rayrock – WL Amendment – Reasons for Decision – Feb 26 25](#).

2.0 Background

The Kwetı́zaà (Rayrock) Remediation Project (the Project) involves the cleanup of the former Rayrock mine and other uranium exploration sites in the surrounding area of the Tłı́chǫ Region (see Attachment 1 for a map). The Rayrock sites were impacted by historic mining activities that occurred between the 1950s and 1970s. Since 1984, information has been collected regarding the risks to humans and the environment, which was used to complete a Human Health and Ecological Risk Assessment (HHERA).³ Remediation activities include the draining, treating, and discharging of Mill Lake water into Sherman Lake, in addition to repair work at two Tailings Containment Areas (TCAs) near the Alpha Lake section of the Sherman Lake Waterbody and Gamma and Beta Lakes. The AEMP Design Plan is a requirement under Part F, Condition 2 of CIRNAC CARD's Water Licence W2020L8-0003 (the Licence) and is designed to detect potential changes in Sherman Lake from the discharge of Mill Lake treated water, as well as any changes to other receiving waterbodies (i.e., Gamma and Beta Lakes) caused by the Project during remediation. The Licence also requires that the AEMP Design Plan be in accordance with the MVLWB/GNWT's Guidelines for Aquatic Effects Monitoring Programs (AEMP Guidelines).⁴

On May 16, 2025, CIRNAC-CARD submitted an AEMP Response Framework for TSS and Turbidity as required by the Board's Reasons for Decision for the Project's Water Licence Amendment (Decision #10).⁵ The Licence Amendment was for a change to the increased the effluent quality criteria (EQC) for TSS from 15 mg /L to 25 mg/L, and the Board required additional Surveillance Network Program (SNP) monitoring. Through the Licence Amendment (Decision #6), the Board required CIRNAC CARD to update Annex A to include SNP stations 1663-14 and 1663-15 for monitoring TSS and turbidity at 100 and 250 metres from the Mill Lake Water Treatment Plant discharge point to verify TSS concentrations remain protective in the Receiving Environment in Sherman Lake. For the Project, SNP stations overlap with AEMP stations; therefore, the Board also required CIRNAC CARD integrate these new SNP stations into the AEMP (Decision #9) and develop the AEMP Response Framework for TSS and Turbidity. As stated in the Board's Reasons for Decision, the purpose of the AEMP Response Framework for TSS and Turbidity is to allow for timely implementation of response actions should increasing TSS and turbidity levels in the Receiving Environment indicate deviations from the results of the environmental risk evaluation and be linked to the Project.

CIRNAC-CARD submitted The AEMP Response Framework for TSS and Turbidity and the Map was distributed for public review on May 20, 2025, inviting reviewers to provide comments and recommendations using the Online Review System (ORS).⁶ Comments and recommendations were received by the deadline of June 10, 2025, from Environment and Climate Change Canada (ECCC) and the Tłı́chǫ Government; Board staff also submitted questions. Fisheries and Oceans Canada (DFO) and CIRNAC Inspectors indicated they had no comments or recommendations for the submission. CIRNAC-CARD

³ See WLWB Online Registry for [Rayrock - IR Response from CIRNAC-CARD - Rayrock HHRA - Nov 20 20](#).

⁴ See LWBs Policies and Guidelines (www.wlwb.ca) for [MVLWB/GNWT Guidelines for Aquatic Effects Monitoring Programs](#).

⁵ See WLWB Online Registry for [Rayrock – WL Amendment – Reasons for Decision – Feb 26 25](#).

⁶ See WLWB Online Review System (new.onlinereviewssystem.ca) for [Rayrock - AEMP Response Framework for TSS and Turbidity](#).

provided responses to reviewer comments by the deadline of June 17, 2025. The review summary is available on the ORS and as an attachment to this Staff Report (Attachment 2).

3.0 Reasons for Decision

The Board has reviewed the submission for conformity to previous Board direction provided in the February 26, 2025, Reasons for Decision and for alignment with requirements outlined in the AEMP Guidelines. The Board also reviewed all reviewer comments and proponent responses submitted during the public review period. Based on the review, the Board decided to approve the AEMP Response Framework for TSS and Turbidity, with revisions and approve the update map showing the locations of SNP stations 1663-14 and 1663-15.

- ***Decision #1: Approve the AEMP Response Framework for TSS and Turbidity and the updated map showing the locations of SNP Stations 1663-14 and 1663-15.***

As indicated in the Board's Reasons for Decision on the amendment, CIRNAC-CARD is required to submit an updated AEMP Design Plan to include the approved Response Framework for TSS and Turbidity and the updated map. Revisions 1 and 2 discussed in Sections 3.2 and 3.3 of this Reasons for Decision should also be included in the update of the AEMP Design Plan.

- ***Decision #2: Require CIRNAC-CARD to submit the updated AEMP Design Plan to include the Response Framework for TSS and Turbidity, the updated map, and Revisions 1 and 2 for Board staff conformity. The updated version of the AEMP Design Plan is to be submitted within 30 days of receiving this Decision.***

3.1 TSS-turbidity Relationship Validation

In the AEMP Response Framework for TSS and Turbidity, CIRNAC-CARD proposed a TSS-turbidity relationship based on a derived 3:1 correlation as outlined by the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Freshwater Aquatic Life (2002). During the public review, Board staff (comment 3) requested clarification on whether the assumptions for the TSS-turbidity relationship have been validated with monitoring results. Board staff also asked CIRNAC-CARD to provide that information if validations existed, or if not, to offer a rationale for its absence.

In response, CIRNAC-CARD stated that in establishing criteria for other Action Levels requested by the Board, CIRNAC-CARD have provided reasoning for using specific benchmarks or relationships. In this case, CIRNAC-CARD used an established and verified relationship from the CCME 2002 guidance for TSS and turbidity. CIRNAC-CARD also noted that the conservative approach to turbidity should compensate for any potential deviations in the ratio. Additionally, CIRNAC-CARD noted that there are some historical data available for in-situ measurements of turbidity paired with laboratory-derived results for TSS. CIRNAC CARD indicated that as data is collected in 2025 using an in-situ probe capable of measuring both parameters, the relationship will be validated for the Project and, if significant deviations in this relationship are observed, the action levels can be revisited.

The Board note that setting a site-specific TSS-turbidity curve is standard practice; however, the Board recognizes that this Project differs significantly from operating mining and milling projects or other contaminated site remediation projects where a continuous effluent discharge occurs over longer periods of time (e.g., 20 or more years). In addition, the Project has a relatively small discharge volume over a relatively short timeframe (i.e., a total of three years, with discharge currently in its second year), conservative EQC for the Project, and a Licence condition that defines the maximum daily volume limit of discharge, all of which offer another layer of protection to the Receiving Environment. Therefore, the Board is of the view that the proposed TSS turbidity relationship based on the assumed 3:1 ratio is acceptable at this time, but verification of this relationship is still important. The Board requires CIRNAC-CARD to assess the TSS turbidity relationship as part of the 2025 AEMP Annual Report to confirm that the use of the CCME 3:1 ratio remains valid.

- ***Decision #3: CIRNAC-CARD to assess the TSS-turbidity relationship as part of the 2025 AEMP Annual Report to confirm that the use of the CCME 3:1 ratio remains valid.***

3.2 Reporting of Low Action Levels Exceedances

In Table 2 of the AEMP Response Framework for TSS and Turbidity, reporting in monthly and annual AEMP Reports is included as a response to a Low Action Level exceedance. During the public review, Board staff asked CIRNAC-CARD to adjust the wording in Table 2 under the Low Action Level exceedance response column, to clearly state that monthly SNP and annual SNP and AEMP reporting is included (Board staff comment 1). Board staff also asked CIRNAC-CARD to include reference to Part F, Schedule 5, Conditions 1(i) and 1(j) to better link those requirements to the response action in Table 2. CIRNAC-CARD agreed to this recommendation. The Board believes that CIRNAC-CARD's response addresses the recommendation and provides additional information that should be included in the update of the AEMP Design Plan.

- ***Revision #1: CIRNAC-CARD to adjust the wording in Table 2 of the AEMP Response Framework for TSS and Turbidity to clearly state that monthly SNP and annual SNP and AEMP reporting is included, as well as include reference to Part F, Schedule 5, Conditions 1(i) and 1(j).***

3.3 Sampling Depth at SNP stations 1663-14 and 1663-15

During the public review, ECCC noted that sampling at a consistent depth at stations 1663-14 and 1663-15 would help ensure results are comparable between sampling events (ECCC comment 1). However, ECCC was unable to find this depth-related information and recommended CIRNAC-CARD specify the sampling depth for both stations. In response, CIRNAC-CARD indicated that samples will be collected at the depth of 0.1 m at both sampling locations, which is consistent with all historical surface water data. The Proponent committed to updating the AEMP Design Plan with the sampling depth. Thus, the Board is of the view that this issue has been adequately addressed and requires CIRNAC-CARD to include this revision in the updated version of the AEMP Design Plan.

- ***Revision #2: CIRNAC-CARD to include the sampling depth for SNP stations 1663-14 and 1663-15 in the next update of the AEMP Design Plan.***

3.4 Other Comments

Water Quality Action Levels

As described in Table 2 of the AEMP Response Framework for TSS and turbidity, the Low and High Action Levels for TSS and turbidity at SNP stations 1663-14 and 1663-15 are based on the following criteria: "The concentration of a weekly sample from 1663-14 and 1663-15 was greater than the Low Action Threshold for in-situ TSS or turbidity readings occurs during the Process Water Treatment Plant discharge period." During the public review, the Tłıchǵ Government (comment 1) suggested that CIRNAC-CARD considers an exceedance of the concentration threshold in a weekly sample from each station independently, as follows: "The concentration of a weekly sample from 1663-14 and/or 1663-15..." In its response, CIRNAC-CARD indicated that the effluent discharge point and SNP stations 1663-14 and 1663-15 are considered to be connected in sequence. CIRNAC-CARD noted that results at SNP station 1663-14 can trigger the low action level regardless of the concentrations at 1663-15. However, if SNP station 1663-15 exceeds the Action Level threshold but SNP station 1663-14 does not, a response would not be triggered. Similarly, CIRNAC-CARD noted that if the effluent results were not high enough to have reasonably influenced TSS at these two monitoring locations, then action levels would not be triggered. The Board agrees with CIRNAC-CARD that for the purpose of these SNP stations, it is reasonable to consider them sequentially connected, as results should indicate the influence from the effluent discharge first at SNP station 1663-14 and then at 1663-15. No further revisions of the Action Levels are deemed necessary at this time.

SNP Station Locations

CIRNAC-CARD provided a map (Attachment 3) showing the proposed locations for SNP stations 1663-14 and 1663-15 as required by the Board through the Licence Amendment (Decision #10). Board staff (comment 2) asked CIRNAC-CARD to confirm whether the proposed location of SNP station 1663-15 could potentially be influenced by in-lake currents, which could affect the trajectory of the effluent plume. In response, CIRNAC-CARD indicated they were not aware of any in-lake currents and that the SNP stations were established at 100 and 250 metres from the discharge point as required. The Board acknowledges that CIRNAC-CARD has met the requirements of the Board directive and note that the station locations can be revisited if monitoring results indicate this is necessary.



Mason Mantla
Chair, Wek'èezhìi Land and Water Board



Witness