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August 20, 2020

File: W2018L3-0001

Memory Murefu
Senior Administrative Officer
Community Government of Gamètì
Gamètì, Northwest Territories
X0E 1R0

Sent by email

Dear Memory Murefu,

Re: Water Supply Facility Characterization and Testing Plan

The Wek'èezhii Land and Water Board (the Board) met on August 19, 2020 and considered the Community Government of Gamètì's Water Supply Facility Characterization and Testing Plan.¹

As described in the Board's Reasons for Decision, the Board has approved the Water Supply Facility Characterization and Testing Plan and provided further direction. The Board requires the Community Government of Gamètì to submit Version 1.1 of the Characterization and Testing Plan and Version 3.2 of the Water Supply Facility Operation and Maintenance Plan. Please review the attached Reasons for Decision for further information.

The Board reminds the Community Government of Gamètì that these submissions should include a revision history table, as per the Board's *Document Submission Standards*.²

Yours sincerely,

A handwritten signature in blue ink, appearing to read "Joe Mackenzie".

Joe Mackenzie

Chair, Wek'èezhii Land and Water Board

Attachment:

- Reasons for Decision

Copied: Wek'èezhii West Distribution List

¹ See WLWB Online Registry for [Gameti – WSF – CTP – Characterization and Testing Plan – May 14 20](#)

² See WLWB Website for the [MVLWB Document Submission Standards](#)



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Reasons for Decision

Reference/File Number:	W2018L3-0001
Licensee:	Community Government of Gamètì
Subject:	Gamètì Water Supply Facility Characterization and Testing Plan (WSF CTP)

Decision from the Wek'èezhì Land and Water Board Meeting of August 19, 2020

1.0 Decision

On August 19, 2020, the Wek'èezhì Land and Water Board (WLWB or the Board) met and considered the Community Government of Gamètì (CGG's) Water Supply Facility Characterization and Testing Plan (WSF CTP or the Plan), required by Part, D, Condition 13 of its W2018L3-0001 Water Licence.¹ The Board decided the following:

1. To approve the WSF CTP and direct the CGG to submit Version 1.1 of the WSF CTP to include Revisions #1 through #4;
2. The CGG is to submit Version 1.1 of the WSF CTP no later than March 31, 2021;
3. The CGG is to submit Version 3.2 of the WSF O&M Plan to include the commitments related to the disposal of backwash as outlined in response to ECCC comment 2; and
4. The CGG is to consider the revisions required for the Community Government of Wekweètì's WSF O&M Plan when it submits Version 3.2 of the WSF O&M Plan. The CGG should propose appropriate revisions or provide rationale in the cover letter for why revisions do not apply.

2.0 Background

The CGG replaced its WSF in 2019. On August 19, 2019, the Board issued an amended Water Licence for the CGG that allowed for the Discharge of Waste from the new WSF. The Amended Water Licence includes new and revised conditions intended to address the uncertainty related to the chemical composition of the Discharge streams (i.e., backwash and wastewater).² Condition 13 requires the CGG to "submit a Water Supply Facilities Characterization and Testing Plan to the Board for approval."

¹ See WLWB (www.wlwb.ca) Online Registry for [Gameti – WSF – Characterization and Testing Plan – May 14 20](#)

² See WLWB Online Registry for [Gameti – Water Licence – Amendment – Aug 19 19](#)

As outlined in the Reasons for Decision (RFD), the WSF CTP should include details on the following:³

- the study to determine the composition of the backwash and wastewater;
- the results of the study to determine the composition of the backwash and wastewater; and
- the proposed testing plan requirements moving forward, including but not limited to, a list of the parameters to be tested, the frequency of testing, and the method of reporting.

The Board stated in its RFD that submission and approval of the WSF CTP would assist the Inspector in its authorization of Waste Discharge from the WSF (Part D, Condition 12) and expected that it would be submitted as quickly as possible. At the time of the Gamètì Water Licence Amendment, the Board did not have sufficient information to provide a reasonable timeframe for this submission and did not want to delay the commissioning of the WSF; thus, the Board directed the CGG to submit a letter within a week of the decision being communicated. The Plan was expected to be submitted at the end of October and during that time, the Government of the Northwest Territories Department of Municipal and Community Affairs (GNWT-MACA) continued to “have discussions and confirmations with the Community [of Gamètì] and the [Government of the Northwest Territories Department of Environment and Natural Resources] GNWT-ENR to determine long term sampling requirements”.⁴ On March 2, 2020, GNWT-MACA submitted sampling results from the wastewater and backwash stream of Gamètì’s WSF. When it was submitted, it was unclear if the information was being provided as an update or as a submission to address the Board’s requirements for the WSF CTP. Board staff communicated the importance of the WSF CTP submission as it was “expected to help inform the impending proceeding to amend the CGW’s Water Licence” and requested it be submitted as soon as possible.⁵

The WSF CTP was received on May 14, 2020 and was prepared by AWC Water Solutions.⁶

2.1 Public Review

The WSF CTP was distributed for public review on May 19, 2020 with reviewer comments due June 9, and proponent responses due by June 16, 2020. Comments were received by Environment and Climate Change Canada (ECCC), GNWT-ENR, and the Tłıchq Government (TG). The Wek’èezhìi Renewable Resources Board (WRRB) indicated it had no comments or recommendations at that time. Board staff also submitted questions. Reviewer comments and recommendations, as well as proponent responses, are available on the WLWB Online Registry.⁷

3.0 Reasons for Decision

3.1 Consideration of the Characterization and Testing Plan

The WSF generates two types of Waste streams: backwash is generated by water being pumped backwards through filters to remove accumulated particles such as sand and dirt and is discharged onto land; and Wastewater is generated from in-plant processes (such as a membrane cleaning process, testing

³ See WLWB Online Registry for [Gameti – Water Licence – Amendment – Reasons for Decision – Aug 19 19](#)

⁴ See WLWB Online Registry for [Gameti – WSF – Characterization and Testing Plan – Notice and Correspondence – Sep 17 19](#)

⁵ See WLWB Online Registry for [Gameti – WSF – Characterization and Testing Plan – Correspondence – Apr 27 20](#)

⁶ See WLWB Online Registry for [Gameti – WSF - Characterization and Testing Plan – May 14 20](#)

⁷ See WLWB Online Registry for [Gameti – WSF – CTP – Review Summary and Attachments – Jun 16 20](#)

and general housekeeping), and is discharged to the Wastewater Tank which is regularly drained for disposal to the Sewage Disposal Facility (SDF) (i.e., sewage lagoon).

In the WSF CTP, testing results for backwash and the Wastewater collected during commissioning were included and compared (as a one-time event) to criteria. Water quality results for raw water were also included for reference. Backwash was sampled for a full set of parameters⁸ and results were compared to the CGG's Water Licence Effluent Quality Criteria (EQC) for Surveillance Network Program (SNP) stations 003-2 and 003-3. Wastewater from the Wastewater Tank was also sampled for a full set of parameters and was compared to Schedule I: Standards for Process Effluent Discharged to Municipal Sewage Systems in the GNWT-ENR's 2004 Guideline for Industrial Waste Discharges in the NWT.⁹ No long-term sampling was proposed.

During the public review, no comments or concerns were raised on the results of the characterization or the criteria used for assessing the results. The Board has reviewed the initial set of sampling results of the Wastewater and backwash and have found them to be comparable to the treated drinking water in Gamètì and to be generally within the ranges of the criteria used for comparison in the WSF CTP (one exceedance was noted and is discussed in section 3.1.1 below). While no issues were raised regarding the results or the criteria used for comparison, reviewers raised some concerns related to the frequency or duration of sampling, additional impacts during disposal, and the quality of Waste not yet sampled (see discussion under 'Clean in Place Waste'). Overall, the Board believes issues raised during the public review regarding the WSF CTP have been addressed by commitments made by the proponent during the public review and can be reflected in a revised WSF CTP and an update to the WSF Operation and Maintenance (O&M) Plan. These commitments and revisions are discussed throughout the Reasons for Decision. The Board believes that the WSF CTP satisfies the Board direction and does not believe there were issues raised during the public review that should prevent the Board from approving CGG's WSF CTP. The Board therefore approves the WSF CTP and requires revisions in Version 1.1 of the WSF CTP.

- ***Decision #1: The Board approves the WSF Characterization and Testing Plan and directs the CGG to submit Version 1.1 of the WSF CTP to include Revisions #1 through #4.***

The Board believes the revisions to the WSF CTP described throughout the Reasons for Decision capture future opportunities to confirm the quality of Waste results and ensure best practices are taken to prevent environmental harm, as well as provide clarity on the commitments made by the proponent during the public review.

As for the timing of the submission, Version 1.1 is to be submitted no later than March 31, 2021. This should allow for sufficient time to incorporate results from the second CIP process (see section 3.1.3 for further discussion) and findings from the ongoing research (discussed in section 3.1.4).

- ***Decision #2: The CGG is to submit Version 1.1 of the WSF CTP no later than March 31, 2021.***

⁸ A full set includes routine water analysis, organics, metals, and bacterial coliform tests according to the WSF CTP.

⁹ https://www.enr.gov.nt.ca/sites/enr/files/guidelines/industrial_waste_guidelines.pdf

3.1.1 Total Suspended Solids

The initial results for Total Suspended Solids (TSS) for backwash exceeded the SNP 003-3 criterion (46.9 mg/L vs 25 mg mg/L) used for comparison in the WSF CTP. No comments or concerns were raised regarding this exceedance during the public review. In response to reviewer comments, the CGG explained that backwash will be disposed of more than 200 feet (ft) away from the lakeshore and thus would eliminate any chance of residual waste entering the source water (see response to ECCC comment 2). With those mitigations in place, the Board does not believe the exceedance of TSS would result in an adverse impact to the Receiving Environment. While the proponent committed to updating the WSF CTP to reflect its response, the Board is of the opinion that this information would be most appropriate in the WSF O&M Plan. Please see 'Mitigations related to Disposal of Backwash' under section 3.2.2.

3.1.2 Clean in Place Waste

Over time, the membranes of the WSF require a CIP process to occur. This process does not occur until the WSF has been in full operation for a few months and after that, is carried out manually typically on six-month intervals, or as triggered by an alarm. In that process, the membranes are soaked with citric acid and sodium hypochlorite (separately) for six hours or over-night, and then manually neutralized and dechlorinated to an appropriate pH and chlorine level. According to the currently approved O&M Plan for the WSF, the residual chlorine concentration has to be less than 0.02 mg/L and the pH has to be between 6.5 - 8 prior to sending Waste to the sump and to the Wastewater Tank.¹⁰

The WSF CTP proposes that characterization of both the CIP Waste and Wastewater Discharge occur at the same location (i.e., Wastewater Tank). It was unclear how the results from the CIP Waste would be characterized distinctly from the Wastewater Discharge if these two types of Waste are sampled at the same location. In follow-up correspondence between Board staff and Stantec, Stantec clarified that CIP Waste would be sampled at the SUEZ membrane tank drain (prior to entering the Wastewater Tank) instead.¹¹ To ensure that the sampling location for the CIP Waste is clear, it should be reflected in Version 1.1 of the WSF CTP.

- ***Revision #1: The CGG is to clarify in Version 1.1 of the WSF CTP that the sampling location for CIP Waste will be at the SUEZ membrane tank drain, prior to CIP Waste entering the Wastewater Tank.***

At this time, no testing results are available to characterize the CIP Waste. According to the WSF CTP, the CIP Waste will be characterized for the first and only time during an upcoming site visit when the first CIP process takes place (anticipated this summer). When asked by Board staff during the public review about the potential/expected effects the addition of CIP water would have on the chemical composition of the Wastewater in the tank (WLWB staff comment 1), the proponent responded by stating "it is to be noted that CIP involves citric acid and sodium hypochlorite cleaning of membranes by soaking them overnight in respective chemical solution. The chemicals [used in the CIP process] are neutralized before being drained to the waste tank...[and] the residual Waste composition will not be exceeding any of the

¹⁰ See WLWB Online Registry for Gameti – WSF – O and M Plan – V3.1 – [Cover Letter](#); [Part 1](#); [Part 2](#), [Part 3](#), [Part 4](#); [Part 5](#); [Part 6](#); [Part 7](#) – Apr 29_20

¹¹ See WLWB Online Registry for [Gameti – WSF – Characterization and Testing Plan – Correspondence – Jul 17 20](#)

discharge guidelines” (response to Board staff comment 1). The Board understands this to mean that effects to the Wastewater in the Wastewater Tank will be minimal, if any. Furthermore, the Board notes that the CIP Waste will enter the Wastewater Tank for eventual disposal at the Sewage Disposal Facility for further treatment. Overall, the Board does not expect that the CIP Waste would result in environmental harm. Regardless, the Board believes the results of the CIP Waste samples should be provided as part of Version 1.1 of the WSF CTP to allow for confirmation and to provide an opportunity for consideration of additional management and/or mitigation measures if necessary.

- **Revision #2: The CGG is to include characterization results for the CIP Waste in Version 1.1 of the WSF CTP.**

3.1.3 Two Characterization Samples

No further characterization or long-term water sampling for any Waste produced by the WSF was proposed in the WSF CTP. The WSF CTP stated that “an onerous long-term sampling program on backwash water and Wastewater Tank would not provide information of practical value to the operations”. During the public review of the CGG’s WSF CTP, GNWT-ENR stated that it had previously recommended that “a minimum of two samples for characterization of backwash, wastewater and Clean-In-Place (CIP) residuals” be taken (GNWT-ENR comment 2). GNWT-ENR also stated that it would:

...appear practical that two characterization sampling events be planned further apart, not only during facility commissioning (cleaner membranes; beginning of operations), but also after a full treatment cycle; and prior to CIP membrane cleaning.

GNWT-ENR thus recommended a second sampling event be conducted for each type of Waste (including CIP Waste) (GNWT-ENR comment 2). Once two sets of results are available for each type of Waste, GNWT-ENR recommended that this data be presented in a format that “facilitates data interpretation, and in a tabular summary with results for various types of wastes” (GNWT-ENR comments 2 and 3). The proponent committed to conducting a second set of backwash and Wastewater sampling during the upcoming site visit to “further establish confidence in the water disposal being safe” (response to GNWT-ENR comment 2 and TG comment 1).

While the proponent has committed to taking a second sample of backwash and Wastewater when it conducts its first CIP process during the public review, there was no mention or commitment made for a second sampling of CIP Waste. The WSF CTP proposes that CIP Waste be characterized once, and for the first time, during a site visit but does not propose further testing of CIP Waste. Because the CIP process is carried out manually on a six-month interval or at an earlier date if triggered by an alarm, a second sampling event to characterize CIP Waste would not be possible until another CIP event takes place.¹² To address any concerns and remaining uncertainty about the CIP Waste, a second sampling for CIP Waste should be conducted.

- **Revision #3: The CGG is to include in Version 1.1 of the WSF CTP the results from two Waste characterization sampling events to determine the composition of all three Waste types**

¹² See WLWB Online Registry for [Gameti – WSF – O and M Plan – V3.1 – Part 1 – Apr 29 20](#)

(i.e., backwash, wastewater, and CIP Waste). These results should be presented in a tabulated summary that would facilitate comparison and interpretation.

The Board notes that results from future research expected at the end of summer (discussed in the next section) may also provide insight on whether any additional sampling regarding the CIP Waste or other types of Waste produced by the WSF may be necessary.

3.1.4 Long Term Monitoring and Future Sampling

While no long-term monitoring was proposed in the WSF CTP, the proponent referenced on-going research through Dalhousie University that could inform potential future sampling. According to the proponent, the purpose of this research is to explore the impacts of WSF residuals and Waste to the environment and provide recommendations on best practices, as well as assist in determining if additional long-term sampling would be necessary. The initial report is expected by end of the summer 2020.

During the public review, the TG stated that (TG comment 1):

While waiting for...evidence from the Dalhousie University study about the impact of WTP residuals and waste to the environment across NWT, it will be important to sample the backwash water and the Wastewater Tank as part of the long-term water quality test plan...[to] help guard against any unforeseen fluctuation in the measured parameters (biological, chemical, and physical) with reference to the guidelines

The proponent responded by recommending that “there is no need of further sampling as the treatment process does not require any hazardous chemical addition. The water quality data from the discharge and Waste are in compliance with the guideline [included and compared to in the CTP]”. As noted in the previous paragraphs above, the Board has flagged an exceedance of one of the guidelines used in the WSF CTP but does not believe it would result in environmental harm based on the mitigations described.

GNWT-ENR also recommended that “treatment objectives or criteria...determined via the current WTP collaborative research initiative [through Dalhousie University]” be presented in the results summary table should they be recommended (GNWT-ENR comment 3). Once the study is completed, GNWT-ENR noted that recommendations relating to monitoring and management best practices for Waste “may be considered and used as condition(s) by the WLWB in order to provide clear directives to the proponent, if/as deemed necessary” (GNWT-ENR comment 4).

Since this study is due by the end of the summer, the Board is of the opinion that it would be reasonable to incorporate this information in Version 1.1 of the WSF CTP. As part of Revision #4 below, the Board requires the CGG to include a summary of findings from the study, along with an implementation plan to respond to any recommendations made by the study, including any recommendations for the Licence and/or the WSF CTP. The Board believes this will provide an opportunity to re-evaluate any need for additional monitoring and/or consideration of potential discharge criteria when the CGG submits its revised WSF CTP. Should the research result in recommendations related to Licence conditions, changes could be considered via a Water Licence Amendment.

- **Revision #4: The CGG is to include the following in Version 1.1 of the WSF CTP:**
- a) a summary of findings from the Dalhousie research study; and**
 - b) an implementation plan to respond to any recommendations made by the study, including any recommendations for the Licence and/or the WSF CTP.**

3.2 Future Changes to the Licence and Submissions

3.2.1 Part D, Condition 12

Part D, Condition 12 was added to the Gamètì Licence during the Amendment in 2019 and states:

The Licensee shall not discharge Waste from the Water Supply Facilities to the Receiving Environment, unless authorized in writing by an Inspector.

During the public review of the WSF CTP, GNWT-ENR recommended that this condition be removed as the proposed wording of the condition “may not be practical because of the frequency of discharge of some of these wastes (e.g., backwash discharges several times a day)...[and could] also create unreasonable expectations for the ENR Inspector, who would be tasked to make a decision on the acceptability of various WTP [WSF] wastes while characterization and/or expected quality is still currently being investigated” (GNWT-ENR comment 4). As an alternative, GNWT-ENR recommended that the condition could be revised to state “the Licensee shall not discharge Waste from the Water Supply Facilities to the Receiving Environment, unless authorized in writing by an Inspector, or as otherwise specified in the CTP”. The Board notes that the changes made when the CGG Water Licence was amended reflected the best option available to the Board at the time to prevent delays in the operation of the WSF. The Board also recognizes that the Inspector may choose to authorize Discharge for a certain time period (e.g., for a six-month period). The Board is also of the opinion that it may be reasonable to amend this condition in Gamètì’s Water Licence; however at this time, the Board will wait until the revised WSF CTP comes in before considering changes to the Licence given that information to be provided in Version 1.1 may inform future conditions and it would be more efficient to address them in one amendment proceeding.

3.2.2 WSF O&M Plan

Mitigations Related to Disposal of Backwash

During the public review of the WSF CTP, ECCC raised some concerns about soil erosion and backwash discharge entering nearby waterbodies. In response to reviewer comments, the proponent stated that backwash will be disposed of more than 200 feet (ft) away from the lakeshore and thus would eliminate any chance of residual waste entering the source water (see response to ECCC comment 2 of the WSF CTP). The proponent also committed to assessing the discharge point for damages and to releveling and graveling the area if there are signs of surface erosion, and committed to updating the WSF CTP with these changes. The Board believes the proponent’s commitments, specifically the mitigations related to the disposal of backwash, should be included in a revised WSF O&M Plan instead of the WSF CTP. The O&M Plans typically outline how each water or waste facility is operated and maintained, and often includes mitigations to prevent environmental impacts or effects. Thus, the proponent’s commitments would be more appropriate in a revised O&M Plan.

- **Decision #3: The CGG is to submit Version 3.2 of the WSF O&M Plan to include the commitments related to the disposal of backwash as outlined in response to ECCC comment 2.**

Lessons Learned from the Wekweètì’s O&M Plan

The Board notes that Gamètì’s WSF O&M Plan may also benefit from revisions in consideration of comments raised in the review of the Wekweètì Water Licence Amendment and WSF O&M Plan.

Decisions for the Wekweètì WSF O&M Plan are in Section 3.4.1 of the Wekweètì WL Amendment Reasons for Decision. Because it was confirmed by Stantec that “there are no differences between the treatment systems and no differences are in effect to the O&M Plans”,¹³ it would seem reasonable to require the CGG to incorporate some of the revisions that are required for the CGW; however, the Board recognizes that the CGG has not been provided with an opportunity to respond to the concerns raised by reviewers and that other considerations for the CGG WSF may be needed. The Board believes that revisions to the CGG WSF O&M Plan can be considered by the CGG when it submits Version 3.2 of its WSF O&M Plan. At that time, the CGG should propose revisions to the WSF O&M Plan or provide rationale in the cover letter of the WSF O&M Plan for why the revisions for the Wekweètì WSF do not apply for the Gamètì WSF.

- **Decision #4: The CGG is to consider the revisions required for the Community Government of Wekweètì’s WSF O&M Plan when it submits Version 3.2 of the WSF O&M Plan. The CGG should propose appropriate revisions or provide rationale in the cover letter for why revisions do not apply.**

Signed the 20th of August 2020, on behalf of the Wek’èezhìi Land and Water Board



Witness



Joe Mackenzie
Chair, Wek’èezhìi Land and Water Board

¹³ See WLWB Online Registry for [Gameti - WSF – Characterization and Testing Plan – Correspondence – Jul 17 20](#)