



Mackenzie Valley Land and Water Board
 7th Floor - 4910 50th Avenue
 P.O. Box 2130
 YELLOWKNIFE NT X1A 2P6
 Phone (867) 669-0506
 FAX (867) 873-6610

Staff Report

Applicant: City of Yellowknife	
Location: Yellowknife, NT	Application: MV2009L3-0007
Date Prepared: September 17, 2013	Meeting Date: September 24, 2013
Subject: Request for a Modification to the Water Licence - New Water Treatment Plant	

1. Purpose/Report Summary

To present to the Mackenzie Valley Land and Water Board (MVLWB or the Board) the request from the City of Yellowknife (the City) for a modification to their Water Licence to construct a new water treatment plant (WTP).

2. Background

- May 31, 2010 – WL MV2009L3-0007 issued;
- May 23, 2013 – drawings and specifications for the new water treatment plant received;
- June 4, 2013 – letter from the City requesting the MVLWB consider the new water treatment plant to be a modification request;
- June 7, 2013 – information request sent to City;
- July 17, 2013 – additional information received from the City;
- July 21, 2013 – 60 day timeline from date of document submission;
- July 24, 2013 – notification sent to the City that more time is needed to review their request;
- July 25, 2013 – modification request and additional information sent for review;
- August 22, 2013 – reviewer comment deadline;
- August 30, 2013 – response to reviewer comments received from the City;
- September 24, 2013 – modification request presented to the Board; and
- May 31, 2022 – WL expiry date;

3. Discussion

Water Licence Background

The City's Water Licence (WL) states:

“Modification” means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work but does not include an expansion.

Part E of the WL contains conditions applying to modifications. Parts E.1 and E.2 state:

E.1 The Licensee may, without written approval from the Board, carry out Modifications to the Water Supply Facilities and Waste Disposal Facilities provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:

- a) The Licensee has notified the Board in writing of such proposed Modifications at least 60 days prior to beginning the Modifications;
- b) Such Modifications do not place the Licensee in contravention of either the Licence or the Act;
- c) The Board has not, during the 60 days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than 60 days; and
- d) The Board has not rejected the proposed Modifications.

E.2 Modifications for which all of the conditions referred to in Part E, item 1 have not been met, can be carried out only with written approval from the Board.

Modification Request

The City has requested that the construction of a new WTP be deemed a modification. They state their reasons for the new WTP being a modification and not an amendment to be:

1. There will be no change to the quantity of water currently allowed by the water licence.
2. There will be no change to the existing water source. The City will continue to draw water from the Yellowknife River using the 8km submarine pipeline.
3. The facility will be located in the same area as the existing treatment facility (Pumphouse #1) and primary water reservoir.

The new WTP will use membrane filtration as an additional water treatment step, which will create a new waste stream.

Information Request

Board staff sent an information request (IR) to the City for the following information:

1. The anticipated composition and volume of the new waste stream(s) that will be generated by the new WTP;
2. Any management actions that would be taken to ensure that water quality at the outflow point of the sewage lagoon system is not affected by the introduction of these new waste(s); and
3. A list of the chemicals that will be used, their purpose, and an MSDS sheet for each chemical to be used.

On July 17, 2013 a response to the IR was received from the City. As this information was received three days before the 60-day timeline was reached, the City was notified that more than 60 days would be needed for the request.

In their response to the IR, the City answered questions 1 and 3, qualifying their answers by stating that some details will not be known until the new WTP system is working. The City identified the sewage lagoon, i.e. the Sewage Disposal Facilities (SDF), as the disposal point for the new waste streams. The City was unable to answer question 2. The explanation they gave was that they do not have enough information on how the SDF currently works to be able to predict the impacts of introducing WTP waste streams.

Information Gaps

Much of the information that is lacking about how the SDF work will likely emerge from two documents required by the City's WL that are overdue:

- Fiddlers Lake Treatment System Plan (D.15 and schedule 2, item 3 of the WL)
- Sewage Effluent Characterization Study (D. 20)

These lagoon studies were due March 31, 2012. The City was granted an extension to October 31, 2012. On October 29, 2012 the City submitted a letter stating that due to a faulty piece of equipment, data collected for these studies was not accurate and the studies could not be submitted. While the City committed to providing an update on the submission timelines for the studies, no update has been received. The explanation the City has given is that they are waiting to hear from their consultant.

Two other documents remain incomplete pending the results of the lagoon studies:

- The Fiddler's Lake Treatment System Study – pH Compliance Point Assessment (pH Study) (D.19) was granted a conditional approval by the Board on August 2, 2012, pending the submission for Board approval of an implementation plan and schedule for mitigative practices (item d). This piece of the study remains outstanding and therefore the pH Study has not yet received full Board approval.
- An Interim Operations and Maintenance Plan for the Sewage Disposal Facilities (SLOMP) was submitted May 31, 2012, however it did not address item 1(e) in Schedule 4 which requires “Details that would trigger the necessity to develop a sludge management plan for the SDF”. The final SLOMP was due March 31, 2013. To date it has not been submitted.

4. Review Comments

Reviewer comments were received from Environment Canada (EC). Please see the comment summary table.

In their comments, EC questions the City's ability to manage sludge levels in the lagoon. EC suggests that the volume of sludge in the lagoon could be having a detrimental effect on the ability of the SDF to treat wastewater, and that adding to that volume with the sludge from the WTP could tax the system further. They recommend that sludge management form part of the mitigation measures in response to the lagoon studies.

The City responded that:

“ until the results of the existing studies are known, it cannot be determined whether there is a problem with the existing sewage lagoon and wetland treatment system which would require the need for a sludge management plan. There are also several unknowns at this time with regards to the composition of the existing sludge in the lagoon and the composition and quantity of sludge that will be produced by the new water treatment plant. Due to these unknowns (sludge composition, quantity and outstanding reports), preparation of a sludge management plan is not possible at this time.”

By completing the sections that remain outstanding in the pH Study and SLOMP, the City will be able to partially address concerns raised by EC. However, the issue of what is currently being done to manage sludge, what should be done, and when it should be done, may not be adequately addressed.

5. Security

N/A

6. Conclusion

Modification or Amendment

A municipal WTP removes (or reduces the concentration of) existing contaminants in the water in order to provide users with clean and safe drinking water. Replacing the existing WTP with a new one that performs equally if not better than the existing one appears to be in line with the original purpose of the work.

In the definition of Modification in the WL, a Modification "...does not alter the purpose or function of the work...". The current WTP uses chlorination and fluoridation only in treating water. However, the proposed WTP will include filtration, coagulation and flocculation, as additions to the current practices. If the Board decides that these changes are beyond the scope of a modification, an amendment to the WL would be required.

The Board could also decide that the creation of new waste streams and their disposal in the SDF requires an amendment to the WL. Currently condition D.1 of the WL states:

D.1 The Licencee shall direct all piped and Pumpout Sewage to the Sewage Disposal Facilities or as otherwise approved by the Board.

In the WL, the SDF are defined as the area and engineered structures designed to contain and treat Sewage. The WL does not mention any other types of waste that could be disposed of at the SDF. However, in the Landfill Operations and Maintenance Plan (LOMP) the City states that leachate from the new landfill cell and compost facility is disposed of in the SDF. In the August 30, 2012 approval letter for the LOMP, the Board required the City to submit testing results for landfill and compost leachate for review and approval prior to discharge into the SDF.

The onus is on the City to provide evidence that the SDF can successfully integrate the new waste stream and have no measurable effect on water quality at the compliance point. They have not provided this evidence with their modification request.

Addressing Information Gaps

Sewage lagoon studies required in items D.15 and D. 20 of the WL are close to 18 months overdue. The City has stated that without the information these studies will provide, they are unable to determine whether there is a problem with sludge management at the existing SDF, or whether introduction of the WTP waste stream will have an adverse effect.

The City anticipates that the overdue lagoon studies will be submitted ahead of the WTP becoming operational. They believe that they will be able to determine any management actions that may be necessary prior to WTP waste streams being introduced.

Sludge monitoring and active sludge management is currently not taking place at the SDF. The addition of sludge from the WTP waste streams is an important change to the operation of the SDF. To address potential negative impacts of this change, the Board could require a sludge management plan to be developed. Currently Schedule 4 Item 1(e) requires the City to submit "Details that would trigger the necessity to develop a sludge management plan for the SDF" as part of the SLOMP. As per condition B.6. that allows the Board to modify Schedules in the WL, Schedule 4 Item 1 (e) could be revised to read:

1(e) A sludge management plan that includes a description of how sludge is monitored, managed, treated, and disposed of. The plan should include the types of sludge produced in the lagoon, received from the water treatment plant and any other sludge sources being disposed of in the lagoon.

Additionally, the Board could request a yearly summary of efforts to manage sewage sludge as part of the WL Annual Report. Item 1 of Schedule 1 could be modified to include an additional item:

A summary of efforts to monitor, manage, treat and dispose of sewage sludge at the Sewage Disposal Facilities.

7. Recommendation

Board staff has prepared the following options for consideration regarding the City's modification request:

1. Grant the City's request for a modification (or grant the *building* of the WTP, but not the *operation* of the WTP until the City has supplied evidence that the quality of waters will not be altered);
2. Defer the decision on the modification request until the City has supplied evidence that the quality of waters will not be altered;
3. Deny the City's request for a modification and direct the City to apply to amend their WL as per 18(1)(b)(i) of the *Northwest Territories Waters Act*; or
4. Take any other option the Board identifies.

As part of the decision on whether or not to grant the City's modification request, the Board should decide whether to require the following additional information:

- a sludge management plan as part of their SLOMP (by modifying Schedule 4 Item 1(e)); and
- a yearly summary of efforts to manage sludge at the Sewage Disposal Facilities (by modifying Schedule 1 item 1 to include an additional item).

Submission of the overdue lagoon studies is critical to moving forward. Board staff recommends that the City provide an update on submission timelines for overdue documents within one month. The pH Study and SLOMP should be included in the update as they are dependent on the outcome of the lagoon studies.

8. Attachments

- Letter from City requesting a modification – June 4, 2013;
- Letter to City requesting further information – June 7, 2013;
- Additional information provided by the City – July 17, 2013;
- EC comment letter;
- Comment summary table;
- Draft approval letter;
- Draft deferral letter;
- Draft denial letter.

Respectfully submitted,



Miki Ehrlich
Regulatory Officer

Review Comment Table

Board:	MVLWB
Review Item:	MV2009L3-0007 - City of Yk - Modification - New Water Treatment Plant
File(s):	MV2009L3-0007
Proponent:	City of Yellowknife
Document(s):	Water Treatment Plant technical drawings and specifications - download link (15 KB) City of Yellowknife response to Water Treatment Plan Information Request (1 MB) City of Yellowknife rationale for Water Treatment Plant being considered a modification (128 KB)
Item For Review Distributed On:	July 25 at 10:24 Distribution List
Reviewer Comments Due By:	Aug 22, 2013
Proponent Responses Due By:	Sep 5, 2013
Item Description:	<p>The City of Yellowknife has submitted a modification request for a new Water Treatment Plant (WTP). Please submit comments using the Online Review System by downloading the excel comment table or using the "add comment" button.</p> <p>Note: the City of Yellowknife submitted technical drawings and specifications documents for the new WTP. These documents were part of the tender package for contractors to bid on and provide technical details on how the WTP is to be built. As the files are large they have not been posted on the Online Review System, however a link to a list of the documents and an ftp site where they can be downloaded is included in the documents section below.</p>
General Reviewer Information:	In addition to the email distribution list, the following organizations received review materials by fax:

	Organization	Contact Name	Contact Position/Title	Email/Fax
	Fort Resolution Métis Council	Trudy King		(867)394-3322; Fieldworker.frmc53@northwestel.net ;
	Hay River Metis Council	Wally Shuman	President	(867)874-4472; hrrmc@northwestel.net ;
	NWT Metis Nation	Tim Heron	NWTMN IMA Coordinator	(867)872-2772; rcc.nwtmn@northwestel.net ;
	Smith Landing First Nation	Andrew Wanderingspirit	Chief	(867)872-5154; chief@slfn196.com ;
Contact Information:	Miki Ehrlich 867-766-7469 Rebecca Chouinard 867-766-7459			

Comment Summary

Proponent General File(s)	
ID	Proponent General File Comment
2	The City plans to dispose of the estimated 650-950m ³ /year of Sludge produced in the sewage lagoon. At this time, the City does not have a plan to manage the sludge that has already collected in the sewage lagoon during the course of the 20+years the system has been in use. In recent years, the lagoon volume has been over capacity, requiring early decanting, which may be a signal that there is too much sludge volume in the base of the lagoon. Additionally, the presence of a flocculant and coagulant in the water treatment plant sludge may react with lagoon wastewater to increase the production of sludge in the lagoon. EC is concerned with the lack of sludge management planning which may be impacting the effectiveness of wastewater treatment in the lagoon.
Environment Canada: Loretta Ransom	

ID	Topic	Reviewer Comment/Recommendation	Proponent Response	Board Response
1	General File	Comment (doc) EC Comment Letter Recommendation		
2	Sludge management	<p>Comment The City plans to dispose of the estimated 650-950m³/year of Sludge produced in the sewage lagoon. At this time, the City does not have a plan to manage the sludge that has already collected in the sewage lagoon during the course of the 20+years the system has been in use. In recent years, the lagoon volume has been over capacity, requiring early decanting, which may be a signal that there is too much sludge volume in the base of the lagoon. Additionally, the presence of a flocculant and coagulant in the water treatment plant sludge may react with lagoon wastewater to increase the production of sludge in the lagoon. EC is concerned with the lack of sludge management planning which may be impacting the effectiveness of wastewater treatment in the lagoon.</p> <p>Recommendation EC recommends that sludge management by means of treatment and disposal form part of the mitigation measures in response to the upcoming Sewage and Wetland Study. This management plan should reflect the types of sludge produced in the</p>	<p>Aug 30: The contract for the outstanding lagoon studies was awarded in 2010, with the budget for the project based on the studies as they were laid out in the City's existing water licence. At this time, the City does not have the budget necessary to change the scope of work for this project to include a sludge management plan for the sewage lagoon. As well, until the results of the existing studies are known, it cannot be determined whether there is a problem with the existing sewage lagoon and wetland treatment system which would require the need for a sludge management plan. There are also several unknowns at this time with regards to the composition of the existing sludge in the lagoon and the composition and quantity of sludge that will be produced by the new water treatment plant. Due to these unknowns (sludge composition, quantity and outstanding reports), preparation of a sludge management plan which includes the information requested by EC is not possible at this time.</p>	<p>Once the overdue lagoon studies are submitted, the City will be required to submit a final Sewage O&M Plan that includes much of this information.</p> <p>Schedule 4, item 1.e) of the City's WL has been modified to read: A sludge management plan that includes a description of how sludge is monitored, managed, treated, and disposed of. The plan should include the types of sludge produced in the lagoon, received from the water treatment plant and any other sludge sources being disposed of in the lagoon.</p> <p>Schedule 1 has been modified to include an additional item: A summary of efforts to</p>

		lagoon, received from the water treatment plant and any other sludge sources being disposed of in the lagoon by the City.		monitor, manage, treat and dispose of sewage sludge at the Sewage Disposal Facilities.
--	--	---	--	--