

From: [Lynn Carter - MVLWB](#)
To: permits@mvlwb.com
Subject: FW: MV2009L3-0007 EC Technical Comments on renewal app.pdf
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Attachments: [MV2009L3-0007 EC Technical Comments on renewal app.pdf](#)

From: Wilson, Anne [Yel] [mailto:Anne.Wilson@EC.GC.CA]
Sent: September-30-09 4:06 PM
To: Lynn Carter - MVLWB
Cc: Ogilvie, Carey [Yel]; Fitzgerald, Jane [Yel]
Subject: MV2009L3-0007 EC Technical Comments on renewal app.pdf

Hi Lynn,
Attached please find EC's technical comments on the renewal submissions.
Give me a call if any questions,
Anne

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<<MV2009L3-0007 EC Technical Comments on renewal app.pdf>>



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Sept. 30, 2009

Our File: 4782 007

Mackenzie Valley Land and Water Board
P.O. Box 2130
7th Floor - 4910 - 50 Ave.
Yellowknife, NT X1A 2P6

By Email

Attention: Lynn Carter

Re: City of Yellowknife Water Licence Renewal Application - MV2009L3-0007

On behalf of Environment Canada (EC), Jane Fitzgerald and I have reviewed the documents submitted in support of the above water licence renewal, and provide the following comments for your consideration. EC's contribution to your request for specialist advice is based primarily on our mandated responsibilities under Section 36(3) of the *Fisheries Act*, and the *Canadian Environmental Protection Act*.

Sewage System

General:

EC supports the proposal to install the pre-treatment system described in the March 31st report by Dillon Consulting titled "Expansion of Fiddler's Lagoon Treatment System Plan".

Issue # 1: Creation of an Operations and Maintenance Manual for the Sewage System

Reference:

Supplementary Report, Section 1.5, page 5

Concern:

The proponent proposes that a licence amendment be made to Part H, Item 1 as they indicate that the "plan for the Operation and Maintenance of the waste disposal Facilities" was addressed under the current licence. However, although there is a Landfill Operations and Maintenance Manual (Supplementary Report, Appendix C), no reference is made to this type of document specifically in relation to the sewage collection and treatment system in the Water Licence application.

Recommendation:

We recommend that an Operations and Maintenance Manual be developed for the sewage system and distributed as needed to help improve the overall care of the system and provide a central location of all information pertaining to the operation of the lagoon.

Issue # 2: Creation of a Sludge Management Plan

Concern:

Various activities take place to help with the capacity issues of the lagoon, such as shoreline clearing and floating mat removal, but no mention is made of sludge dredging, nor is there an explanation of why this does not occur. However, it is noted that part of operations of the new pre-treatment system will involve dredging sludge from the settling pond every 10 years (Expansion on Fiddler's Lagoon Treatment System Plan, Section 5.1.2, page 15).

Recommendation:

Sludge removal should be considered to increase the lagoon system's long-term capacity. Study and management plans should be developed in order to address this question and to implement procedures for sludge removal.

Issue # 3: Proposed Increase to Ammonia Limit

Reference:

Supplementary Report, Section 1.6, page 7 & Section 5.6.6, page 28
Lagoon Treatment System Plan, Section 4.2.3 page 13 & Section 5.1.2, page 14

Concern:

This section of the water licence specifies targets for loadings of nutrients and coliforms to Great Slave Lake. The City has requested ammonia loading targets be set at 15 mg/L average and 20 mg/L maximum for grab samples. Presumably these are to be met at the compliance point at the outflow of F3, which provides considerable treatment and dilution for effluent. It does not appear that average ammonia concentrations warrant the criteria being set that high; if they did approach those levels there would be concern that F3 required a control structure and retention capability. Monitoring results do show under-ice exceedances of the maximum grab value of 10 mg/L in five of the past 7 years; this appears to be a seasonal phenomenon and is likely related to the effluent making its way following decant to F3 during the ice cover period when there is little algal uptake nor natural degradation. Additionally, the new pre-treatment system is being designed to help with the reduction of ammonia in order to meet current criteria in the future and it is predicted that in 2028 the level of ammonia at the compliance point will still be less than 5 mg/L.

Similar trends are seen for phosphorus, and measures must be determined to achieve the reduction of phosphorus. Work done in the Fiddler's system by EC in February 2000 identified high levels of phosphorus in the sediments which will cycle into the water cover during winter for some time to come.

Recommendation:

It is not clear whether the nutrient targets are intended to be used as regulatory criteria or if they are objectives. In the latter case, EC recommends that the average for ammonia remain at 5 mg/L, with the target of no more than 10 mg/L grab maximum concentration. If the intent is to regulate ammonia and phosphorus, there will need to be further discussions on what is reasonable and achievable.

Issue # 4: Methods and Destination of Materials from Sewage Lagoon Maintenance Activities

Reference:

Questionnaire, Section 4.19, page 9

Questionnaire, Section 4.25, page 10

Supplementary Report, Section 8.9, page 43

Concern:

Several references are made to cleaning being done in and around the sewage lagoon, including the honey bag pit, the shoreline at the discharge pipe, and the removal of floating mat islands. For the honey bag pit, the Questionnaire states “City staff clean out the site as required (a minimum of six times per year).” Additionally, the Supplementary Report states that “The City continues to carry out work at the sewage lagoon by removing floating mat islands and cleaning the shoreline at the discharge pipe.” However at neither reference are further details provided to indicate exactly how these are carried out and what is done with any collected material.

Our concern is that either this material is not being deposited at a designed facility, or if it is being deposited at the Solid Waste Facility (SWF), no reference is made in the SWF’s Operation and Maintenance Manual as to its transport and disposal.

Recommendation:

The management methods and disposal of these materials need to be included in the Sewage Lagoon Operation and Maintenance Manual once developed. As well, if any material is being deposited at the Solid Waste Facility, the Operation and Maintenance Manual for that facility also needs to be expanded to describe the disposal procedure for all sewage related material in order to ensure safe handling and appropriate disposal.

Issue # 5: Deposit of Sediment from Baler into Lagoon system

Reference:

Supplementary Report, Appendix C, Section 3.1, page 12

Concern:

In the description of how the baler facility at the Solid Waste Facility is cleaned, it is noted that the sump under the baler acquires sediments and liquids, both of which are cleaned out and discharged into the lagoon system. “The sediments are cleaned out by the City vacuum trucks for disposal at the sewage lift station for eventual discharge at Fiddler’s Drainage Area”. While it is understandable that liquids be disposed of in this manner, it is not clear why sediment would be. The disposal of sediments in this way would seem to be adding to capacity issues in the lagoon, especially considering at this point it is unclear if sledge dredging is occurring or not. If dredging is occurring, or if it will be implemented in the future, the addition of sediment to the system would appear to be increasing the work load and energy needed to manage the lagoon system.

Recommendation:

The City should examine what other options are possible for the disposal of sediment from the baler sump.

B. Solid Waste Facility

Issue # 6: Treatment of Contaminated Water

Reference:

Supplementary Report, Section 6.1.2, page 33

Supplementary Report, Appendix C, Section 2.3, page 6-7

Concern:

In the description of operations for hydrocarbon contaminated water, it is indicated that the water is put in the “lagoon” at the contaminated soil site, however there is no mention of a lagoon in the description of treatment of contaminated soils just the presence of a “pad”. As such, it remains unclear how contaminated water is stored and treated. Additionally, it is also indicated that if treatment of the water is necessary, following treatment it is stored in holding tanks, but it is not stated where these tanks are located. And finally, information is also lacking in terms of the release of treated water. Where is water released to, i.e. what is the receiving environment?

Recommendation:

Clarification is required on a number of operation issues concerning the storage, treatment methods, and release of contaminated water before the appropriateness of the management of this waste can be evaluated.

Issue # 7: Lack of Information on Leachate and Surface Waters from the Solid Waste Facility

Reference:

Supplementary Report, Section 6.5, page 35

Drainage Study, Section 5, page 16

New Solid Waste Facility – Preliminary Design Report, Section 4.23, page 16

Drainage Study, Appendix A, page 20

Concern:

In the description of the leachate sampling results for the four SNP stations at the landfill in the Supplementary Report, it is stated that “all results are within acceptable limits”, however it is not clear what is being considered as “acceptable limits”. Furthermore, if targets do exist for water quality exiting the landfill than it is important to not only be sampling this water, but also to have a plan in place to deal with the potential surpassing of the targets.

There are also concerns with the drainage patterns from the solid waste facility. The site map in the Drainage Study, Appendix A shows six different catchment areas and the four SNP stations. However, it would appear that given some of the flow directions, not all the surface water or leachate from the site exits through the 4 stations, giving rise to the question of how representative these sites are. On the same map two lakes are indicated, one in catchment E and the other in catchment C, however as no flow patterns are described it is unclear where or how water from these ponds exits. Are there streams present on site? Is this water pumped out? The first major findings listed in the Drainage Study summed up these concerns in that “surface water flows on site and mitigation off site are currently uncontrolled”.

Recommendation:

EC agrees with the recommendation of the Drainage Study that further study on leachate pattern and characteristics be undertaken. This information would not only be important to the maintenance of the current facility, but also to the development of the new facility; one of the recommendations put forward by the preliminary Design Report was that estimates of leachate generation and concentration be developed in order to help with the final design of the facility. EC also agrees with the study's recommendation that a plan to intercept, direct, contain and test surface waters should be implemented. A similar plan should also be developed for leachate exiting the site. Details on how any collected water should be treated, if water quality limits are not met, would also be necessary to incorporate into the plan(s).

Issue # 8: Recommendation to Initiate Measuring for Dissolved Metals

Reference:

Drainage Study, Section 3.3.2.1, page 8

Drainage Study, Section 5, page 17

Concern

One of the recommendations in the drainage study was that "Further sample analysis should include dissolved metals to reduce the impact of suspended particles in the water column and to facilitate comparison among monitoring stations. However, effects on the receiving environment may be caused by both suspended and dissolved metals

Recommendation:

Therefore, while adding dissolved metals to the testing parameters may be an asset, testing for total metals should be continued.

Issue # 9: Assumption that Elevated Metals in Drainage are Not a Concern

Reference:

Drainage Study, Section 3.3.2., page 8-9 & Section 3.4, page 10

Concern

EC is concerned that the elevated levels of metals in drainage from the Solid Waste Facility are being overlooked. In the Drainage Study it is stated that the high levels of various metals were "not an immediate concern as metals may be naturally occurring". Subsequently in the same report, in response to several metals consistently being above guidelines, it is stated that "It is difficult to determine...if these are the result of metals leaching from the SWF, or naturally high metal concentrations present in the soil and/or rock."

Recommendation:

Until it can be proven that the high levels of metals present in drainage from the Solid Waste Facility are due to elevated background levels these results remain a concern. An investigation into the source of the metals should be undertaken.

C. Proposed Licence Amendments

Reference:

Supplementary Report, Section 1.5

Issue #10: Term of Licence

Concern:

The City is requesting a 15 year licence term. EC does not support this length of licence; while the City has shown progress on the requirements of the existing licence, a number of submissions and/or actions were done well past the due dates. There will be a number of action items as requirements in the renewal licence, and the renewal process provides a good opportunity for performance review and amendment to update and reflect changes in operating conditions.

Recommendation:

EC recommends a licence term of no longer than ten years.

Issue #11: Amendment of Bioassay Test Requirements

Concerns:

1. The expiring licence requires that there be 100% survival of all organisms in the two bioassay tests used (rainbow trout and *Daphnia magna*). This is stricter than the standard method protocol, which allows for 10% mortality in the control organisms
2. Timing and purpose of toxicity testing should be revisited and aligned with the Canada-wide Strategy for Municipal Wastewater Effluent requirements which will be in effect in the North by approximately 2015.

The Canada-wide Strategy for Municipal Wastewater Effluent document titled *Technical Supplement 2: Environmental Risk Management* describes the objective of the effluent being not acutely toxic at end of pipe (i.e. up to 50% mortality is allowed) and having no toxicity (chronic or acute) outside a given mixing zone (see Section 3.5 and 5.4) http://www.ccme.ca/assets/pdf/mwwe_techsuppl2_ermm_guidance_e.pdf.

Whole effluent acute and chronic testing will eventually be required under the MWW E strategy. The City is currently collecting bioassay samples at F3, which is beyond the last point of control (F6), but within the treatment system. Bioassay testing was initially requested by Environment Canada for the purpose of evaluating effects within the system and ensuring that flow into Great Slave Lake remained non-toxic. This objective has been achieved, and the samples collected at 0032-F3 have consistently passed both tests. The upcoming requirements are expected to have intermittent discharge lagoons take two samples during each discharge period: one sample near the start of the discharge period, and one near the end. EC supports the City's proposed change to have samples submitted to an accredited lab for testing, and asks that the results be placed on the public record with monthly SNP reports.

EC was pleased to see the City is planning for the work which will be required under the Canada-wide Strategy for Municipal Wastewater Effluent, and is proposing to do initial characterization of the effluent in 2011. There should be discussions about where the appropriate "end of pipe" location is sampled.

Recommendation:

1. Toxicity test criteria should be set higher than 50% survival given the distance from the last point of control, but should not be set at 100% as this is inconsistent with the biological test method requirements. EC supports the City's request to use 90% survival of all organisms.

2. EC recommends that the bioassay samples be collected twice annually: once following spring freshet, and once 4-6 weeks into decant. The rationale for this is that effluent released from F6 in the fall moves down the system and will potentially move through Lake F3 with the spring freshet. The Strategy recommends that two samples be taken in each discharge period, however in this case we must allow for the lag time between discharge and reaching the compliance point.

Issue #12 Operations and Maintenance (O&M) Plan Submission Part H.1

Recommendation:

This section could be amended to simply require review and updating of the O&M plan annually, with changes filed with the Board in the Annual Report. If updates are not for approval by the Board, there should be a clause that requires re-submission of the plan for approval in the case of significant changes.

Please do not hesitate to contact me at (867) 669-4735 with any questions or comments regarding the foregoing.

Yours truly,

Anne Wilson
Water Pollution Specialist
Environmental Assessment - North,
Environmental Protection Operations

cc: Carey Ogilvie (Head, Environmental Assessment-North, EPOD)
Jane Fitzgerald (Environmental Assessment Coordinator, EPOD)

