



Environment Environnement
Canada Canada

ENVIRONMENTAL PROTECTION OPERATIONS
Prairie and Northern Region
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November 27, 2009

Our file: 4782 007

Willard Hagen,
Chairperson
Mackenzie Valley Land and Water Board
P.O. Box 2130
Yellowknife, NT X1A 2P6

By Email

Dear Mr Hagen:

Please find attached Environment Canada's written submission to the Mackenzie Valley Land and Water Board (MVLWB) in respect to the scheduled Public Hearings concerning the City of Yellowknife's Water Licence renewal.

Environment Canada staff will be in attendance at the public hearing to make a formal presentation of this intervention, and will be available to respond to any questions which the MVLWB members, the proponent, or the public may have concerning the issues raised by Environment Canada in this submission.

If you wish clarification on any aspect of this submission prior to the public hearing, please contact Anne Wilson at (867) 669-4735 or by email at anne.wilson@ec.gc.ca.

Yours sincerely,

Warren Fenton
A/Manager
Environmental Assessment and Marine Programs

cc: Carey Ogilvie (Head, Environmental Assessment - North, Environment Canada, Yellowknife)
Anne Wilson (Water Pollution Specialist, EA-North, EPOD)
Jane Fitzgerald (Environmental Assessment Coordinator, EA-North, EPOD)



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**ENVIRONMENT CANADA'S
INTERVENTION
RESPECTING THE
THE CITY OF YELLOWKNIFE
TYPE A
WATER LICENCE APPLICATION**

Submitted to the
Mackenzie Valley Land and Water Board
Yellowknife, NT

November 27, 2009

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1.0 Introduction

This intervention to the Mackenzie Valley Land and Water Board (MVLWB) is made on behalf of Environment Canada (EC) regarding the application by the City of Yellowknife for a water licence for municipal water use and waste disposal. The licence would permit the use of water and the disposal of waste in connection with municipal activities as described in the water licence application and supporting documents.

This intervention is prepared based on information submitted by the applicant to the MVLWB. EC may wish to seek additional advice or expertise for any new information presented to the Board.

1.1 Mandate of Environment Canada

Environment Canada is a science-based department whose business is to help Canadians live and prosper in an environment that needs to be conserved and protected. The Department focuses on provision of scientific expertise for incorporation into decisions on developments, such that all parties working together can ensure that there is minimal impact on the natural environment, and that ecosystem integrity is maintained and preserved for future generations.

The mandate of EC is determined by the statutes, regulations, guidelines, policies, federal, territorial, and international agreements, and related programs that it is assigned by Parliament to administer. The overall objective is to foster harmony between society and the environment for the economic, social and cultural benefit of present and future generations of Canadians. The Department shares this goal with other federal agencies, provinces, territories and First Nations.

The *Department of the Environment Act* provides EC with general responsibility for environmental management and protection. Its obligations extend to and include all such matters over which Parliament has jurisdiction, which are not by law assigned to any other department, board, or agency of the Government of Canada. These include matters related to preservation and enhancement of the quality of the natural environment (e.g. water, air, soil), renewable resources including migratory birds and other non-domestic flora and fauna, water, meteorology, coordination of policies and programs respecting preservation and enhancement of the quality of the natural environment, development of standards and guidelines, promotion of sound environmental practices, and providing advice to federal government agencies. In delivering on these obligations Environment Canada has responsibility for specific legislation, regulations, policies, and agreements.

Of particular concern and interest for the current project are the responsibilities conferred on the Department by legislation and standards such as the:

- *Canadian Environmental Protection Act*
- *Fisheries Act* (Sections 36-42)

Please see Appendix A for a brief description of the above instruments.

2.0 Background

The City of Yellowknife has applied for renewal of its Type A water licence in connection with municipal water use and municipal waste disposal. The principal activities include the use of up to 3,631,000 m³ of water by 2025, the disposal of the same quantity of sewage into Fiddlers Lagoon system, and the disposal of solid waste, including hydrocarbon-contaminated soil and water, and hazardous materials, at the Solid Waste Disposal facility.

EC participated in the technical meeting held in Yellowknife November 12th 2009, and found that helpful in preparation of the intervention. This intervention presents issues related to our mandate which are still outstanding or require further clarification, and summarizes areas of agreement on issues which have been addressed. Should new or additional relevant information be brought forward in the course of the public hearings, this submission will be re-examined. Within the context of the additional information, any changes in EC's recommendations and position will be brought to the attention of the Board and the proponent.

3.0 Technical Comments and Recommendations

The Department's review focuses on areas within the water licence application which fall under the Department's mandated responsibilities, with comments organized under the following headings:

1. Sewage Disposal and Treatment
2. Solid Waste Disposal Facility
3. Proposed Changes in the New Water Licence

Within each category, comments are organized by specific issue and detail concerns, rationale, and recommendations.

3.1 Sewage Disposal and Treatment

3.1.1 Issue: Optimization of the Fiddler's Lake Treatment System

Concern and Rationale:

The expiring licence required the City to conduct a study and provide a plan to achieve the best possible treatment of municipal waste. This plan (*Expansion on Fiddler's Lagoon Treatment Plan*) was recently submitted by Dillon Consulting, and provided predictions that support the need for treatment to be installed over the twenty year design horizon. The options explored were limited to expansion of the primary lagoon, or installation of a pre-treatment system. It appears that the City is not considering installation of the pre-treatment system at this time, and is looking for higher discharge limits rather than exploring other ways to improve treatment. EC is concerned that

delaying improvements to the system will result in the ability of the system to effectively treat effluent being diminished over time, as capacity and attenuation are reduced while loadings increase. In the technical sessions, the City acknowledged that over time it is expected the need for treatment will arise. EC feels that by determining what is needed earlier, rather than later, more options to work with the existing system lifespan can be available, and performance can be optimised to reduce discharge of nutrients and other effluent parameters.

EC's Recommendation:

EC recommends that other options be evaluated for managing/configuring the system such that effluent quality is improved for the long term, and ammonia and phosphorus discharges are minimized. These could include: aeration within the primary lagoon, installation of a control structure at the outlet of F3 and increasing capacity of F3 to provide additional retention time; and reviewing discharge timing to optimize use of the wetlands.

3.1.2 Issue: Nutrient Reduction and Proposed Increase to Ammonia Targets

Concern and Rationale:

The expiring licence specified targets for nutrients which should be planned for in the Fiddler's Lake Treatment System Plan, and recommended ammonia be set at an average of 5 mg/L (average) with a maximum concentration of 10 mg/L (grab). These concentrations are deemed to be reasonable given the compliance point is at the end of Lake F3, and indeed the measured values have rarely exceeded these levels. The City has requested higher numbers (15 and 20 mg/L for average and maximum grab, respectively). EC acknowledges that future increased in population as well as reductions in system treatment capability may make the lower numbers difficult to meet on a consistent basis. Predictions made in the Dillon report were for average ammonia levels reaching 6 mg/L by 2028.

At this time, it does not appear that average ammonia concentrations warrant the criteria being set that high; if they did consistently approach the requested levels there would be concern that F3 required a control structure and retention capability, or other means of improving treatment be implemented. 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.

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

EC's Recommendation:

It is not clear whether the nutrient targets specified in the expiring licence (D.11) 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. If moderately higher ammonia concentrations are to be discharged from F3, it should be demonstrated that actions are being taken to ensure no future increases occur, and the effluent must not be deleterious. Phosphorus loadings to Great Slave Lake remain of concern, and EC recommends that the City look further at phosphorus removal.

EC supports the effluent characterization program proposed in Section 1.6 of the water licence application Supplementary Report.

3.1.3 Issue: Lack of a sludge management plan.

Concern and Rationale:

Various activities already take place to help with the capacity issues of the lagoon, such as shoreline clearing and floating mat removal; sludge removal should also be considered to increase the lagoon system's long-term capacity.

EC's Recommendation:

EC recommended in its initial comment letter dated September 30, 2009 that study and management plans should be developed in order to address this issue and to implement procedures for sludge removal if deemed necessary. In their response to our comments dated October 20, 2009, the City agreed that it's appropriate to perform a study on sludge removal of the lagoon and will be looking into performing a feasibility study. EC recommends that a sludge management plan be developed and included with the O&M Manual.

3.1.4 Issue: Bioassay testing of effluent and compliance point.

Concern and Rationale:

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. 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. By having a higher pass criteria (i.e. above 50%) downstream of the last point of control, some assurance is provided that effluent leaving F3 will be both non-acutely toxic at the receiving environment and have little to no chronic toxicity. The receiving environment is considered to start at F1 (approximately 1.5 km from Great Slave Lake) which is the point up to which fish frequent the stream. This was determined through field investigations by DFO in the early 1990s, and at that time it was accepted by the NWT Water Board, the City, and

regulators that the treatment system did not include anything downstream of that point, and that waters below F1 were to be protected.

EC's Recommendations:

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 recommends that the bioassay samples be collected twice annually: once following spring freshet, and once 4-6 weeks into decant. 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.

3.2 Solid Waste Disposal Facility

3.2.1 Issue: Discharge of treated water from the landfarm.

Concern and Rationale:

The documented procedure for the release of water from the water treatment lagoon at the Solid Waste Facility is to release it through a pipe to a wooded area SE of the lagoon, however it is unclear whether or not the discharge area is adequate to absorb the water. At the technical session it was indicated that there has been visual verification that the water is absorbed by the discharge area, however no monitoring has been performed to verify this. Given that the water quality standards being applied to this water prior to release are the Livestock Water Quality Guidelines and not the Aquatic Life Water Quality Guidelines there is concern this water may be reaching surface waters containing aquatic life. Furthermore, no information is provided on when the treated water is released or in what quantities, both factors that would impact the absorption ability of the discharge area.

EC's Recommendation:

Work needs to be conducted to identify the absorption ability of the discharge area, including under different conditions, such as time of year, and for a range of quantities released. It should be confirmed that there is no risk of discharge reaching surface waters. In addition, the Operation and Maintenance Manual for the water treatment lagoon at the Solid Waste Facility needs to be updated to include details on the procedure for the release of water from this facility, and document when the wastewater should be sent to the Giant Mine tailings ponds.

3.2.2 Issue: Lack of information on leachate from the Solid Waste Facility.

Concern and Rationale:

While EC can appreciate that obtaining information on seepage throughout the landfill is difficult, as mentioned by the city at the Technical Session, we still feel that this is an important issue and worthy of continued investigation. As no information is available to indicate leachate movement throughout the site, it is inappropriate to assume that the four

sampling stations, designed to sample surface runoff, would also capture any leachate draining from the site. Until further information on site conditions shows otherwise, leachate movement and characterization remains an important issue.

EC's Recommendation:

EC is pleased to see that the city is interested in pursuing this issue, as stated at the Technical Session, and recommends further study be undertaken to measure and characterise leachate generated at the landfill.

3.2.3 Issue: Identification of natural background levels of metals in the environment around the Solid Waste Facility.

Concern and Rationale:

Given the potential for elevated levels of metals in the vicinity of the Solid Waste Facility, practically arsenic, it is important to identify the natural level before analysing the impact of drainage from the landfill in order to distinguish between the two. In our initial comment letter dated September 30, 2009 EC recommended that an investigation into the source of the metals should be undertaken, as 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. In their written response to our comments dated October 20, 2009 and at the Technical Session on November 12, 2009, the City agreed that the guideline criteria for metals should be based on background concentrations and agreed it's appropriate to follow-up with this matter in order to establish new criteria for metals in the drainage from Solid Waste Facility that is site specific. Elevated metals in the site drainage have been documented, and the source needs to be identified and further action taken if warranted.

EC's Recommendation:

EC recommends that the City document site conditions with respect to metals in the vicinity of the Solid Waste Facility, and propose appropriate criteria. In addition, consideration must be given to remedies should the source of elevated metals be the landfill, such as the installation of a collection and treatment system as mentioned by the City in the technical meetings.

3.3 Proposed Changes in the New Water Licence

3.3.1 Issue: Proposed amendments to current licence in relation to Operation and Maintenance plans of waste disposal facilities. The water licence application suggests that amendments be made to the current licence (Supplementary Report, Section 1.5, page 5) regarding the development of the Operation and Maintenance Plan for the waste disposal facilities with the assumption that these plans have already been developed, but this is not the case for the Sewage System.

Concern and Rationale:

The proponent proposes that Part H, Item 1 in the current licence be deleted from the renewal 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), there is currently no Sewage System Operation and Maintenance Manual. The presence of a Sewage System Operations and Maintenance Manual is an important tool for operators, and for consistent and efficient operation, as well as to enable reviewers that opportunity to comment on the procedures being utilized at the facility.

EC’s Recommendation:

An Operations and Maintenance Manual should be developed for the wastewater system and distributed for review, preferably within the first 12 months following issuance of the new licence. Following the initial submission, the Operations and Maintenance Manual should be reviewed and updated annually, with changes filed with the Board in the Annual Report. If annual 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.

3.3.2 Issue: Term of Licence

Concern and Rationale:

The City is requesting a 15 year licence term (Supplementary Report, Section 1.5). 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 and recommended actions have not been implemented. 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.

EC’s Recommendation:

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

4.0 Conclusion

EC would like to thank the MVLWB for the opportunity to comment on the City of Yellowknife’s water licence renewal application, and we hope that these technical comments and recommendations are useful to the Board in their decision-making process. EC respectfully request the opportunity to submit additional written comments after the public hearings to address any new information brought forward at the hearings. EC staff are available to review a draft water licence. We look forward to further discussions at the January 19-20, 2010 Public Hearing in Yellowknife.

APPENDIX A: ENVIRONMENT CANADA'S RELEVANT LEGISLATION, POLICIES AND GUIDELINES

Department of the Environment Act

The *Department of the Environment Act (DOE Act)* provides EC with general responsibility for environmental management and protection. Its obligation extend to and include all matters over which Parliament has jurisdiction, and have not by law been assigned to any other department, board, or agency of the Government of Canada as related to:

- Preservation and enhancement of the quality of the natural environment (e.g. water, air, soil)
- Renewable resources including migratory birds and other non-domestic flora and fauna
- Water
- Meteorology
- Coordination of policies and programs respecting preservation and enhancement of the quality of the natural environment.

The *DOE Act* states that EC has a mandated responsibility to advise heads of federal departments, boards and agencies on matters pertaining to the preservation and enhancement of the quality of the natural environment. As such, this mandate is extremely broad.

Canadian Environmental Protection Act, 1999

Proclaimed on March 31, 2000, the new *Canadian Environmental Protection Act, 1999* (CEPA 1999, referred to hereinafter as *CEPA*) is an Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development. *CEPA* shifts the focus away from managing pollution after it has been created to preventing pollution. The Act provides the federal government with new tools to protect the environment and human health, establishes strict deadlines for controlling certain toxic substances, and requires the virtual elimination of toxic substances which are bioaccumulative, persistent and result primarily from human activity.

For substances that are declared “toxic” under *CEPA* and are added to the List of Toxic substance in Schedule 1 of the Act, instruments will be proposed to establish preventive or control actions for managing the substance and thereby reduce or eliminate its release into the environment. These tools may be used to control any aspect of the substance’s life cycle, from the design and development stage to its manufacture, use, storage, transport and ultimate disposal.

Examples of preventive and control instruments include:

- Regulations;
- Pollution prevention plans;

- Environmental emergency plans;
- Environmental codes of practice;
- Environmental release guidelines; and
- Pre-notification and assessment of new substances (chemicals, biochemicals, polymers, biopolymers, and animate products of biotechnology).

Authority to require emergency plans for toxic or other hazardous substances is provided in Part 8 of *CEPA*. Environmental emergency plans for such a substance(s) must cover prevention, preparedness, response and recovery.

Fisheries Act – Pollution Prevention Provisions

The Minister of Fisheries and Oceans is legally responsible to Parliament for administration and enforcement of all sections of the *Fisheries Act*. However, under a Prime Ministerial Instruction (1978) and a Memorandum of Understanding (1985), EC administers and enforces those aspects of the Act dealing with the prevention and control of pollutants affecting fish. In this context, EC works to:

- Advance pollution prevention technologies;
- Promote the development of preventative solution; and
- Work with the provinces, territories, industry, other government departments and the public on issues relating to the pollution provisions of the *Fisheries Act*.

The main pollution prevention provision is found in subsection 36(3) of the Act, and is commonly referred to as the “general prohibition”. This subsection prohibits the deposit, into fish-bearing waters, of substances that are deleterious to fish. The legal definition of “deleterious substance” provided in subsection 34(1) of the Act, in conjunction with court rulings, provides a very broad interpretation of deleterious and includes any substance with a potentially harmful chemical, physical or biological effect on fish or fish habitat. One measure of a deleterious substance (such as a liquid discharge) is acute lethality as measure by the standard 96 hour fish bioassay test.

Rob Dobson

From: Lynn Carter - MVLWB [lcarter@mvlwb.com]
Sent: Monday, November 30, 2009 3:41 PM
To: 'Rob Dobson'
Subject: FW: City of Yellowknife water licence intervention
Attachments: MV2009L3-0007 City of Yellowknife EC intervention.pdf; Cover Letter - MV2009L3-0007 City of Yellowknife EC intervention.pdf

From: Elaine Briere - MVLWB [mailto:elaine@mvlwb.com]
Sent: Monday, November 30, 2009 9:17 AM
To: lcarter@mvlwb.com
Subject: FW: City of Yellowknife water licence intervention

From: Fitzgerald,Jane [Yel] [mailto:Jane.Fitzgerald@EC.GC.CA]
Sent: Friday, November 27, 2009 3:02 PM
To: permits@mvlwb.com
Cc: Wilson,Anne [Yel]; Ogilvie,Carey [Yel]; Fenton,Warren [Edm]
Subject: City of Yellowknife water licence intervention

Please find attached EC's intervention for the City of Yellowknife's Water Licence renewal. Included are a cover letter and our written intervention in a separate document from the cover letter.

Thank you,

Jane

Jane Fitzgerald

Environmental Assessment Coordinator | Coordonnatrice en évaluation environnementale
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