



GOVERNMENT OF  
NEWFOUNDLAND AND LABRADOR

Department of  
Municipal and Provincial Affairs

**CIRCULAR**

**To:** All Consultants  
**Re:** Generic Terms of Reference for Water Treatment  
**Date:** April 8, 2003

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Attached are Generic Terms of Reference to be used, as specified in the applicability section of the terms of reference, when developing water treatment for any Municipalities or Local Service Districts.

The Province is concerned that some Municipalities and Local Service Districts are developing Water Treatment facilities without giving full consideration of their water consumption, water quality objectives, appropriate technologies and impact on their operating budgets. The intent of the Terms of Reference are to ensure that a full evaluation is completed of options available for water treatment.

If you are aware of any Municipalities or Local Service Districts, that are your client, who have applied for water treatment meeting the applicability outlined in the Terms of Reference you should contact them and discuss revising their application to meet these new requirements.

A handwritten signature in blue ink that reads "Wayne Churchill".

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**WAYNE CHURCHILL, P. ENG.**  
**Assistant Deputy Minister**  
**Engineering Services**

Attach.

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# Water Treatment

## Generic Terms of Reference

### Objective

The process of selecting a water treatment system must ensure that the selected treatment system is appropriate and affordable for the municipalities specific needs. They are intended to outline requirements to be studied prior to design of a water treatment system. It should be noted that it may take several years from the start of the selection process to the construction of the plant.

### Applicability

The Generic Terms of Reference for Water Treatment **apply if** the municipality is proposing treatment to provide:

- ▶ Filtration of particles <50 Micron in size.
- ▶ Color or THM reduction through the removal or oxidation of precursors
- ▶ Inactivation or removal of Giardia or Cryptosporidium Cysts

Any variance from these terms of reference will require approval of the Department of Municipal and Provincial Affairs.

### Administration

A Municipality intending to construct a water treatment system must establish a working committee to oversee the technical aspects of the selection process. The working committee will consist of:

- ▶ Representatives of council
- ▶ Technical representatives of council either from their consultants and/or from their own staff
- ▶ Administration representatives of council (IE. Town Manager)
- ▶ Representatives of Department of Environment, Department of Municipal and Provincial Affairs and Department of Government Services and Lands

## 1. Water Usage and Design Flows

- a. Review the existing water usage for the community. The water usage should identify appropriate categories such as domestic, commercial and unaccounted for flows. If no reliable records are available then a flow testing program should be undertaken.
- b. Flow readings should be taken in order to determine the actual peak flows deliverable by the water system and the conditions requiring these flows. (IE. such as the fish plant operating at full capacity, a major fire occurring at the same time as a water line break etc)
- c. Review methods of water conservation and reduction in peak demand requiring water treatment. This review should include:
  - i. Supply heavy commercial users with untreated water
  - ii. Installation of water conservation equipment in individual homes
  - iii. Freeze protection of service lines
  - iv. Leak detection and repair
  - v. Waterline replacement
  - vi. Separate treatment systems for drinking water distribution
  - vii. Point of use / centrally managed water treatment systems
  - viii. All other feasible strategies
  - ix. Water storage tanks
- d. A design flow will be considered acceptable if it is not greater than 125% of the theoretical calculated using DOE standard flow rates with accepted peaking factors and realistic growth projections. Any flow rate greater than this must receive the prior approval of the Department of Municipal and Provincial Affairs and conclusive evidence that designing a water treatment system for the higher flow rate will be more cost effective than available water conservation methods.

## 2. Selection of Best Available Technology

- a. Before beginning the selection of the most appropriate treatment process, the approval of the Department of Municipal and Provincial Affairs must be given for the design flow selected.
- b. Before beginning the selection process, water quality objectives must be approved by the Department of Environment. (IE. Color <5, 3 log removal / inactivation of Giardia cysts, THM reduction to below 50 PPB on seasonal average) Any expected variances from the Canadian Drinking Water Guidelines must be identified.
- c. Feasibility of regional water systems **must** be analyzed. Communities in proximity with water supplies should be examined to determine the cost effectiveness of joining of water systems and sharing water treatment facilities. The analysis should include an estimate of capital and operating costs of appropriate scenarios. A present worth or equivalent annual worth analysis should be carried out to determine the feasibility of a regional system.
- d. Using the design flow, the most appropriate treatment process must be objectively chosen from a variety of available technologies. Consultants must prepare a review of at least 6 (six) available water treatment technologies that are appropriate to accomplish the goals of water treatment.
- e. A preliminary selection process on the 6 available water treatment technologies will be carried out without the benefit of bench or pilot testing. Estimates (+/- 50%) of capital, operating and maintenance costs are to be reviewed and compared on a present worth or equivalent annual worth basis. No consideration of possible cost sharing ratios will be given. This process will select at least 3 (three) potential treatment methods to be further analyzed.
- f. The consultant will retain the services of an independent laboratory specializing in water treatment to carry out bench testing of the 3 selected processes to determine actual performances and to allow more accurate estimates of operating, maintenance and capital costs. New estimates (+/- 10%) are to be provided along with revised present worth and equivalent annual worth comparisons.
- g. Further pilot plant testing may be required prior to detailed design of the water treatment plant. The consultant will submit details of proposed pilot plant testing to the Department of Municipal Affairs prior to commencing. Test results from the pilot plant testing will be used to confirm previous financial analysis.
- h. The Best Available Technology will be selected on the basis of these estimates and other considerations deemed appropriate by the council and the Department of Municipal and Provincial Affairs.

## 3. Impact on Municipal Budgets

Construction and operation of a water treatment system will require a significant commitment of funding from both the municipal and provincial governments. Therefore, a full review of the financial impact on the municipal budget is required. The consultant may retain the services of a financial specialist to assist with the budgetary analysis.

- a. The Department of Municipal and Provincial Affairs will provide a preliminary estimate of the cost sharing ratio for the capital portions of the project. The cost sharing ratio should not impact the selection of Best Available Technology. If the Department's cost sharing policies make a less financially viable option more attractive to the municipality, then this should be identified in the report. Under no circumstance will the Department contribute financially to the operation or maintenance of the water treatment system.
- b. Prepare a seven (7) year budget submission using the current budget policies of the Department of Municipal and Provincial Affairs assuming appropriate costs for operation, maintenance and capital repayment.
- c. The Seven Year Budget will be submitted to the Department of Municipal and Provincial Affairs for approval.