

APPENDIX B

Guidelines for the Determination of Natural Filtration Log Removal Credits for Protozoa

B1 Introduction

Natural filtration refers to the ability of an aquifer to remove microscopic particulates, such as *Giardia and Cryptosporidium*, as groundwater migrates through the aquifer towards a water well. Natural filtration is most appropriately applied as one component of a treatment process and is best suited to systems with minimal influence of surface water.

The purpose of this appendix is to outline the criteria for determining which Municipal Public Drinking Water Supply systems in Nova Scotia that use groundwater as a source are eligible for a natural filtration log removal credit for protozoa and describe how these Municipal Public Drinking Water Supplies can apply for this credit.

B2 Eligible Systems

A Municipal Public Drinking Water Supply system is eligible for a natural filtration log removal credit if it meets the following conditions:

- a. All three steps of the *Protocol for Determining Groundwater Under the Direct Influence of Surface Water* (GUDI Protocol - Appendix A), as amended from time to time, have been completed;
- b. The supply has been determined to be GUDI;
- c. The supply has been determined to be medium or low risk based on the Microscopic Particulate Analysis (MPA) results from Step 3 of the GUDI Protocol; and
- d. An additional MPA test, taken after the Step 3 GUDI Protocol MPA samples, confirms the well is medium or low risk.

B3 How to Apply for a Natural Filtration Credit

To be awarded a natural filtration credit, eligible Approval Holders shall apply in writing to the Department district office where the water system is located.

The written application shall include the following information for each well:

- a. Water supply name;
- b. Well name and map showing well location;
- c. Confirmation that the well has completed the GUDI Protocol and it has been classified as a GUDI - Medium Risk or GUDI - Low Risk; and
- d. Confirmation that, based on geological maps, well log information, and water supply information, the well is not located in one of the following settings:
 - Spring;
 - Infiltration gallery;
 - Horizontal collection well;
 - Karst aquifers; or
 - Enhanced recharge infiltration systems.
- e. Results from an additional MPA test, taken after the Step 3 GUDI Protocol MPA samples, to confirm the well is medium or low risk.
- f. Groundwater quality data from Step 2, in particular raw water turbidity data and raw water total coliform and *E. coli*.
- g. Assessment of wells with respect to their potential location within floodplains. Floodplain location can be assessed using existing information such as flood maps, local topography, geomorphology, municipal documents, local historical knowledge and air photos. If wells are either known to be, or may have high likelihood of being within 1:100 year floodplains it is expected that contingency plans will be developed to mitigate flooding effects on the wells.
- h. Confirmation that the well is not located within 60 metres of a surface water body that has the potential for stream channel erosion. Note that the potential for stream channel erosion can be evaluated by examining the history of high-flow and flood events at the site and by reviewing air photographs for evidence of stream channel meander.

The information submitted shall be complete and acceptable to the Department.

The applicant will receive a written response from the Department indicating whether a natural filtration credit will be awarded.

B4 Criteria for Awarding a Natural Filtration Credit

Natural filtration log removal credits will be awarded by the Department to eligible systems on a case-by-case basis.

To be considered for a natural filtration credit, medium or low risk GUDI systems are required to perform at least one additional MPA test, taken after the Step 3 MPA samples, to confirm the original MPA results collected during Step 3 of the GUDI study. The additional MPA test shall be collected when the well is most susceptible to surface water influence as described and determined in Appendix A.

If the additional MPA results indicate that the sample has a high risk score, the system is not eligible for a natural filtration credit.

If the results of the additional MPA testing confirm results of medium or low risk scores, the system is eligible for a natural filtration credit.

- All medium risk GUDI systems will receive a 1.0 log removal credit for protozoa, unless there are site-specific reasons that indicate a natural filtration log removal credit should not be awarded.
- All low risk GUDI systems will receive a 3.0 log removal credit for protozoa, unless there are site-specific reasons that indicate natural filtration log removal credits should not be awarded.

Site-specific issues will also be considered by the Department when awarding a natural filtration credit.