



## Massachusetts Department of Environmental Protection - Drinking Water Program

### Ground Water Rule – Log Credit Determination

Public Water Suppliers with Gaseous or Liquid Chlorine

Instructions for Form:  
GWR Form A – Log Credit

**Introduction:** In preparation for the Ground Water Rule (GWR), and in accordance with 310 CMR 22.04(1)(a)3., the Massachusetts Department of Environmental Protection's Drinking Water Program (MassDEP/DWP) requires all GWR applicable public water systems (PWS) with chlorine disinfection to determine the viral log inactivation currently achieved at their system and the additional log treatment required to meet 4-log virus treatment. By completing this form, PWSs and the MassDEP will be better prepared to respond to future fecal contamination events. All PWSs currently using chlorine disinfection must make this determination and mail two completed and signed form to MassDEP Regional Office, Attn: DWP GWR. PWSs with multiple wells and/or chlorination points must perform this calculation for each disinfected point of entry and submit a schematic indicating the relative location of these points and connecting pipes (i.e. are wells connected prior to chlorination); hand drawn schematics are acceptable.

If you need assistance completing this form, please contact the Massachusetts Coalition for Small System Assistance at <http://www.masmallwatersystem.org> or your regional MassDEP GWR contact listed below. An MS Word version of form is available at: <http://www.mass.gov/dep/water/approvals/dwsforms.htm#gwr>

Central: Kelly Momberger – 508-849-4023

Western: Jim Bumgardner – 413-755-2270

Northeast: Jim Dillon – 978-694-3231

Southeast: Mike Quink – 508-946-2766

**Background:** Beginning December 1, 2009, all PWSs must comply with the new federal GWR. This rule is intended to increase public health protection against potential viral contamination in ground water sources. The GWR does not require disinfection or treatment of all ground water systems. However, those systems with significant deficiencies or documented fecal contamination will be required to take corrective actions and might be required to provide 4-log (99.99%) treatment of viruses.

If your treatment system does not provide 4-log inactivation and/or removal of viruses, you must conduct triggered monitoring in accordance with the GWR requirements in response to each positive total coliform sample collected under the Total Coliform Rule. If fecal contamination is verified at a your PWS during triggered source water monitoring, you will be required to issue Tier 1 public notification and provide emergency disinfection to meet 4-log treatment of viruses while your PWS is evaluated.

**How to determine whether a chlorinated ground water system is providing 4-log (99.99%) inactivation of viruses:** Inactivation of viruses using a chemical disinfectant is based on the "CT" concept where "C" is the measured concentration of the chemical disinfectant residual and "T" is the contact time between the point of application of the disinfectant and the point where the disinfection residual is measured. The point where the residual is measured must be before or at the first customer or first connection providing water to the public. T, the contact time of the disinfectant in minutes, is determined by dividing the total volume of system components (pipe, storage tank), in gallons, by flow, in gallons per minute (gpm), of the system. Once C is measured and T is determined from the flow and size of the system components, the product C x T (CT) is compared to EPA developed tables of CT values that are required to achieve inactivation of viruses.

If your system disinfects with gaseous or liquid chlorine, use the formulas and table on Form GWR A to determine the CT (Concentration of free chlorine ( $C_{mg/L}$ ) X contact time ( $T_{minutes}$ )) that is achieved for your groundwater. The CT required to meet 4-log will depend on your groundwater source's temperature, the free chlorine residual concentration in your water at the first customer and the amount of time that the water spends in contact with chlorine before the first customer. Under the GWR, if a system can achieve a CT at least equal to or greater than the CT needed for 4-log inactivation of viruses, the PWS is not required to meet the triggered monitoring requirements of the rule. However, such a system must comply with GWR treatment and compliance monitoring requirements.

**Note:** 4-log treatment of viruses can be achieved through a combination of disinfection and membrane filtration or other state approved treatment processes. If your PWS provides 4-log treatment, you must submit supporting documentation (in addition to completing the form) prepared by a Professional Engineer. Please call your regional contact for more information on the approval process and future monitoring requirements.