



Division of Environmental Health

Terry L. Pierce, Director

State of North Carolina
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Department of Environment and
Natural Resources

William G. Ross, Secretary

Public Water Supply Section

Jessica G. Miles, Section Chief

November 20, 2008

Ground Water Systems' Notification of 4-log Treatment

The Ground Water Rule was published by EPA on November 8, 2006 to provide increased protection against pathogens in public water systems that use ground water sources. The rule requires systems that do not provide 4-log (99.99%) removal or inactivation of viruses to perform "triggered source water monitoring" in response to each positive total coliform sample collected in the distribution system under the Total Coliform Rule. Alternatively, systems that do provide 4-log treatment can perform "compliance monitoring" rather than the "triggered source water monitoring." Note that 4-log treatment for viruses can be achieved using inactivation (disinfection), removal (filtration), or a combination of inactivation and removal, as approved by the State. The enclosed State Notification Form can be used by systems using gaseous or liquid chlorine and contact time in the water pipes only to help determine if 4-log treatment is being provided.

Ground Water Rule Requirements and State Notification: (complete text of the federal Ground Water Rule can be found at <http://www.epa.gov/safewater/disinfection/gwr/regulation.html>)

➤ If your system **does** provide 4-log (99.99%) removal or inactivation of viruses and chooses to perform "compliance monitoring" rather than "triggered source water monitoring" you must:

1. **Notify the State, in writing, by June 1, 2009.**

- Systems that intend to claim 4-log credit using gaseous or liquid chlorine and pipe only must complete the enclosed State Notification Form. An explanation of what constitutes 4-log treatment of viruses for chlorine disinfection is provided on the form. If your system uses more than one ground water source, make copies of the form before filling it out and submit one completed form for each source. All requested information must be provided. Completed forms should be mailed to this office at the address on the bottom of the form. The State Notification Form is also available on our Web site at <http://www.deh.enr.state.nc.us/pws/GWR.html>.
- Systems that intend to claim 4-log credit using storage or disinfection other than chlorine (e.g., chlorine dioxide, ultraviolet radiation, ozone) should contact our representatives identified in this letter for assistance on determining the amount of log credit for your treatment. Alternatively, you can hire the services of a professional engineer to determine your system's ability to achieve 4-log credit using storage or non-conventional disinfection and to prepare your submittal to the State.

2. **Begin "compliance monitoring" by December 1, 2009.** Systems providing 4-log treatment are required to measure minimum disinfectant residual concentrations at or before the first customer at least daily for systems serving 3,300 or fewer people and continuously for systems serving greater than 3,300 people and report these concentrations to the State. Compliance monitoring forms are being developed by the State and will be sent out later to systems that provide 4-log treatment.

1634 Mail Service Center, Raleigh, North Carolina 27699-1634
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➤ If your system **does not** provide 4-log (99.99%) removal or inactivation of viruses or chooses to conduct “triggered source water monitoring” instead:

1. Do NOT submit the enclosed State Notification Form.
2. Begin “triggered source water monitoring” effective December 1, 2009. Your system will be required to sample your ground water sources in response to each positive routine total coliform sample collected in the distribution system under the Total Coliform Rule.

If you are not sure how to determine how much virus treatment your system achieves, call Alex Gorbounov (919) 715-3238 or Jackie Roddy at (919) 715-0576 for assistance.

Sincerely,

Linda F. Raynor
Compliance Services Branch Head
Public Water Supply Section

State Notification Form for Ground Water Systems Providing 4-log Treatment of Viruses

(For systems that disinfect with gaseous or liquid chlorine and are claiming 4-log credit based on pipe only)

PWSID #: _____

System Name: _____

Facility ID #: _____

Contact Person: _____

Phone Number: _____

Does Your System Provide 4-log Treatment of Viruses?

If your system disinfects with gaseous or liquid chlorine and intends to claim 4-log credit for virus inactivation using **pipe contact time only**, use the formulas and table below to determine the CT (CT = Concentration of free chlorine (C mg/L) X contact time (T minutes)) that is provided for your ground water. The CT required will depend on your ground water source's temperature, the free chlorine residual concentration in your water at the first user and the amount of time that the water spends in contact with chlorine before the first customer. "CT" is an abbreviation for chlorine Concentration multiplied by Time.

To calculate your system's CT, multiply the free chlorine residual (in mg/L) at your first user's service connection by the shortest amount of time (contact time, T minutes) water is coming into contact with the chlorine. The shortest contact time occurs during the hours of peak flow.

- System's free chlorine residual at first user's service connection, C = _____ mg/L
- Pipe Length_{feet}, L = _____ feet
- Pipe Diameter_{inches}, D = _____ inches
- Pipe Volume_{gallons}, V = Length_{feet} x π x (Diameter_{inches} / 2)² x (7.48_{gal/cu. ft.} / 144_{sq. in./sq. ft.}); V = _____ gallons
- Peak Flow, F = _____ gallons/minute
- Shortest amount of time water is coming into contact with the chlorine, (T = V/F)
Time, T = Pipe Volume_{gallons} / Peak Flow Rate_{gallons per minute}; T = _____ minutes
- Calculate Total CT (chlorine residual concentration C multiplied by Time T), CT = C x T = _____ min-mg/L
- System's ground water source's coldest water temperature, t = _____ degrees C°

On Line A in the table below circle the value that most closely relates to the temperature recorded on line 8 above. On Line B in the table circle the 4-log inactivation value that is associated with the temperature you circled on line A. Compare your CT value from Line 7 above with the value you circled in Line B of the table below. If your CT is a number larger than the number you circled in Line B then your system probably provides at least 4-log treatment of viruses.

CT Values for Inactivation of Viruses by Free Chlorine, pH 6.0 - 9.0

A.	Degrees C°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
B.	4-log inactivation	11.6	10.7	9.8	8.9	8.0	7.6	7.2	6.8	6.4	6.0	5.6	5.2	4.8	4.4	4.0	3.8	3.6	3.4	3.2	3.0

CT values provided in the tables are modified by linear interpolation between 5°C increments.

Note: If your current system configuration and operational parameters do not produce the required CT, but you would like to achieve 4-log treatment for viruses, increasing the length of pipe and/or minimum disinfectant concentration may be necessary.