



**New Mexico Environment Department
Drinking Water Bureau**

Certification of Virus Inactivation by Chlorination

The New Mexico Drinking Water Regulations allow a certified operator to install a hypochlorination system in a water system that is supplied by ground water that is not under the direct influence of surface water. The certified operator must be certified at the level required in the Utility Operator Certification Regulations, 20.7.4 NMAC. The certified operator is responsible for the project. The certified operator must certify the inactivation ratio achieved by the hypochlorination system, and document that calculation on a form that the Drinking Water Bureau provides. This is the form that should be used to comply with the provision of the New Mexico Drinking Water Regulations at 20.7.10.200.C(2) NMAC.

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. The contact time of the disinfectant in minutes (T) is determined by dividing the total volume (in gallons) of system components (pipe, storage tank) by the 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 the EPA developed tables of CT values shown below that are required to achieve 2-log, 3-log or 4-log inactivation of viruses..

If your system **does not provide** 4-log inactivation of viruses by chlorination and chooses to “triggered source water monitoring” you may complete and submit this application for each entry point on the system to New Mexico Environment Department Drinking Water Bureau (Department) to document your level of inactivation.

Please select one:

- I wish to certify by providing 4 Log Inactivation of Viruses, as supported by the provided documentation.
- I do not meet 4 Log Inactivation and will perform triggered source water monitoring. The level of treatment achieved by my residual is: ___ Log

| A. System Information | | | |
|------------------------------|--|------------|--|
| System Name | | | |
| System Type | Community <input type="checkbox"/> Non-Transient Non-Community <input type="checkbox"/> Transient Non-Community <input type="checkbox"/> | | |
| System Population | Less Than 3300 <input type="checkbox"/> Greater Than 3300 <input type="checkbox"/> | | |
| PWS Number | | | |
| System Owner | | | |
| System Representative | | | |
| System Address | | | |
| Email Address | | | |
| Phone Number | | Fax Number | |



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| | | | |
|---|--------------------------|--------------------------|-----------------|
| B. Flows (Please include units) | | | |
| Minimum Flow | | | |
| Monthly Average | | | |
| Peak Hourly Flow | | | |
| Maximum Flow Possible | | | |
| C. Contact Chamber Information | | | |
| Submit drawings of the contact time chambers/storage tank. The drawings shall show any baffling associated with the chamber/storage tank including the configuration of the inlet and outlet. Include each pipe segment as a separate contact chamber. References for baffling factors can be found in Appendix A. | | | |
| Contact Chamber Name | Maximum Volume (Gallons) | Minimum Volume (Gallons) | Baffling Factor |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| D. Primary Disinfectant | | | |
| E. Disinfection Schematic | | | |
| Submit drawings which show the location of injection points, residual sample points, and raw water taps. The drawings shall also indicate the location and size of contact chambers/storage tank and each pipe segment used to calculate log inactivation. | | | |
| F. Chemical Feed Pumps | | | |
| (Submit the specifications for chemical feed pump including dosing rates) | | | |
| G. Contact Time Calculations | | | |
| These calculations must provide enough detail to demonstrate to the Department that the system can achieve 4-log inactivation/filtration of viruses. If these calculations include contact chambers (other than pipe segments), storage tanks, disinfectant systems other than sodium hypochlorite, or filtration systems, the calculations must be performed by a State Certified Operator at a Level 3 or higher certification, or a Professional Engineer licensed in the State of New Mexico. Include units or referenced formulas in calculations. For CT reference values, refer to Appendix B. | | | |
| H. Chemical Dosing Rate Calculations | | | |
| These calculations must specify the chemical pumping rate and concentration of the primary disinfectant. | | | |
| I. Sampling (attach additional sheets as necessary) | | | |
| Proposed Sampling Location | | | |
| Proposed Sampling Method | | | |
| Proposed Minimum Residual | | | |



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| Project and System Information | |
|---------------------------------------|--|
| System Name | |
| PWSID | |
| Entry Point Name/Number | |

I (name), _____ certify that the _____ Public Water System achieves the level of virus inactivation using chlorine disinfection that is reflected in this submittal.

Please submit your completed Application that documents your level of virus inactivation to NMENV-DWBPlanReview NMENV-DWBPlanReview@state.nm.us. Please make submittals electronically. Please email a link to an FTP site with attachments posted as Adobe Acrobat files (pdf). For submittals smaller than 50 MB, an email message with attachments is acceptable.

| Signature of System Representatives | | | |
|---|------|--------------|-----------|
| Role | Date | Printed Name | Signature |
| ¹ Owner | | | |
| ¹ The owner is an individual, corporation, partnership, association, state or political subdivision thereof, municipality, or other legal entity. | | | |
| ² Applicant/System Legal Representative | | | |
| ² The system legal representative is the legally responsible agent and decision-making authority for a public water system (e.g. mayor, president of a board, public works director). The Designer or Consulting Engineer is not the legal representative. | | | |



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Appendix A: Baffling Factors

EPA/625/6-91-027

Table 4-4. Factors for Determining Effective Disinfection Contact Time Based on Basin Characteristics* (9)

| Baffling Condition Description | Factor | Baffling |
|--|---------------|---|
| Unbaffled high | 0.1 | None; agitated basin, inlet and outlet flow velocities, variable water level |
| Poor | 0.3 | Single or multiple unbaffled inlets and outlets, no intra-basin baffles |
| Average with | 0.5 | Baffled inlet or outlet some intra-basin baffling |
| Superior | 0.7 | Perforated inlet baffle, serpentine or perforated intra-basin baffles, outlet weir or perforated weir |
| Excellent | 0.9 | Serpentine baffling throughout basin. |
| Perfect (plug flow) | 1.0 | Pipeline flow. |
| *Based on hydraulic detention time at minimum operating depth. | | |



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Appendix B: EPA CT Values for Inactivation of Viruses by Free Chlorine

| CT Values for Inactivation of Viruses by Free Chlorine, pH 6.0 – 9.0 | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Temperature | | | | | | | | | | | | | | | | | | | | | | | | | |
| °C | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| °F* | 33 | 35 | 37 | 39 | 41 | 42 | 44 | 46 | 48 | 50 | 51 | 53 | 55 | 57 | 59 | 60 | 62 | 64 | 66 | 68 | 69 | 71 | 73 | 75 | 77 |
| *truncated conversions to ensure conservative values | | | | | | | | | | | | | | | | | | | | | | | | | |
| Log Inactivation | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 5.8 | 5.3 | 4.9 | 4.4 | 4.0 | 3.8 | 3.6 | 3.4 | 3.2 | 3.0 | 2.8 | 2.6 | 2.4 | 2.2 | 2.0 | 1.8 | 1.6 | 1.4 | 1.2 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 3 | 8.7 | 8.0 | 7.3 | 6.7 | 6.0 | 5.6 | 5.2 | 4.8 | 4.4 | 4.0 | 3.8 | 3.6 | 3.4 | 3.2 | 3.0 | 2.8 | 2.6 | 2.4 | 2.2 | 2.0 | 1.8 | 1.6 | 1.4 | 1.2 | 1.0 |
| 4 | 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 | 2.8 | 2.6 | 2.4 | 2.2 | 2.0 |

From Table 4-4 in the GWR Implementation Guidance E-PA 816-R-09-004 January 2009