Rulemaking Hearing Rules of
the
Tennessee Department of Environment and Conservation
Division of Water Supply
Chapter 1200-5-1
Public Water Systems

Amendments

Rule 1200-5-1-.04 Definitions is amended by deleting the existing language in its entirety and substituting the following language so that as amended the rule shall read:

1200-5-1-.04 Definitions.

(1) "Action level" is the concentration of lead or copper in water which may determine the treatment requirements that a water system is required to complete.

(2) “Bag Filters” are pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed on a non-rigid fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to outside.

(3) “Bank Filtration” is a water treatment process that uses a well to recover surface water that has naturally infiltrated into ground water through a river bed or bank(s). Infiltration is typically enhanced by the hydraulic gradient imposed by nearby pumping water supply or other wells.

(4) “Benchmark” A disinfection benchmark is the lowest monthly average value of the monthly logs of *Garidia Lamblia* inactivation.

(5) “Business Plan” means a document which identifies source(s) of income or revenue sufficient to meet expenses over a three (3) year period. The business plan will identify costs related to retaining a certified operator, estimated annual infrastructure repair costs, depreciation, facility maintenance fees, estimated annual monitoring costs, estimated costs of providing public notices, estimated administrative costs, and any and all other operational, treatment, and related costs (e.g. chemicals and other supplies used to treat water, etc.). The business plan must include the re-payment of borrowed and amortized funds.

(6) “Capacity Development Plan” means a document(s) identifying what actions a public water system is taking or shall take to become a “viable water system.” Such plan shall include information concerning retention of a Certified Operator in direct charge; system ownership and accountability; staffing and organizational structure; fiscal management and controls, source water assessment and protection plan; “business plan;” and any and all other information identifying any further action that shall be taken.

(7) “Cartridge filters” are pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed a rigid or semi-rigid self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.

(8) "Coagulation" means a process using coagulant chemicals and mixing by which colloidal and suspended materials are destabilized and agglomerated into flocs.

(9) “Combined distribution system” is the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

(10) "Community Water System" means a public water system which serves at least fifteen (15) service connections used by year-round residents or regularly serves at least twenty-five (25) year-round residents.

(11) "Compliance cycle" means the nine-year calendar year cycle during which public water systems must monitor for certain contaminants. Each compliance cycle consists of three three-year compliance periods. The first calendar year cycle begins January 1, 1993 and ends December 31, 2001; the second begins January 1, 2002 and ends December 31, 2010; the third begins January 1, 2011 and ends December 31, 2019.

(12) "Compliance period" means a three year calendar year period within a compliance cycle. Each compliance cycle has three three-year compliance periods. Within the first compliance cycle, the first compliance period runs from January 1, 1993 to December 31, 1995; the second from January 1, 1996 to December 31, 1998; the third from January 1, 1999 to December 31, 2001.

(13) “Comprehensive performance evaluation (CPE)” is a thorough review and analysis of a treatment plant’s performance-based capabilities and associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant’s capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. For purposes of compliance, the comprehensive performance evaluation must consist of at least the following components: assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

(14) "Confluent growth" means a continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion thereof, in which bacterial colonies are not discrete.

(15) "Connection" means the point at which there is a meter or service tap if no meter is present.

(16) “Consecutive system is a public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

(17) "Contaminant" means any physical, chemical, biological, or radiological substance or matter in water.

(18) "Conventional filtration treatment" means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal.

(19) "Corrosion inhibitor" means a substance capable of reducing the corrosivity of water toward metal plumbing materials, especially lead and copper, by forming a protective film on the interior surface of those materials.

(20) "CT" or "CTcalc" is the product of "residual disinfectant concentration" (C) in mg/1 determined before or at the first customer, and the corresponding "disinfectant contact time" (T) in minutes, i.e., "C" x "T". If a public water system applies disinfectants at more than one point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or "total inactivation ratio". In determining the total inactivation ratio, the public water system must determine the residual disinfectant concentration of each disinfection sequence and corresponding contact time before any subsequent disinfection application point(s). "$CT_{99.9}$" is the CT value required for 99.9 percent (3-log) inactivation of Giardia lamblia cysts. $CT_{99.9}$ for a variety of disinfectants and conditions appear in Tables 1.1-1.6, 2.1, and 3.1 of 1200-5-1-.31(5)(b)3.

$$\frac{CTcalc}{CT_{99.9}}$$

is the inactivation ratio. The sum of the inactivation ratios, or total inactivation ratio shown as

$$\sum \frac{(CTcalc)}{(CT_{99.9})}$$

is calculated by adding together the inactivation ratio for each disinfection sequence. A total inactivation ratio equal to or greater than 1.0 is assumed to provide a 3-log inactivation of Giardia lamblia cyst. Disinfectant concentrations must be determined by tracer studies or an equivalent demonstration approved by the Department.

(21) "Department" when used in these regulations shall mean the Division of Water Supply, Tennessee Department of Environment and Conservation, or one of the Division's Field Offices. The terms "State," "Department," and "Division" are often used interchangeably in these Rules and Regulations.

(22) "Diatomaceous earth filtration" means a process resulting in substantial particulate removal in which (1) a precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum), and (2) while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the feed water to maintain the permeability of the filter cake.

(23) "Direct filtration" means a series of processes including coagulation and filtration but excluding sedimentation resulting in substantial particulate removal.

(24) "Disinfectant" means any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone added to water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms.

(25) "Disinfectant contact time" ("T" in CT calculations) means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration ("C") is measured. Where only one "C" is measured, "T" is the time in minutes that it takes for water to move from the point of disinfectant application to a point before or at where residual disinfectant concentration ("C") is measured. Where more than one "C" is measured, "T" is (a) for the first measurement of "C", the time in minutes that it takes for water to move from the first or only point of disinfectant application to a point before or at the point where the first "C" is measured and (b) for subsequent measurements of "C", the time in minutes that it takes for water to move from the previous "C" measurement point to the "C" measurement point for which the particular "T" is being calculated. Disinfectant contact time in pipelines must be calculated based on "plug flow" by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe. Disinfectant contact time within mixing basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.

(26) "Disinfection" means a process which inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.

(27) “Disinfection profile” is a summary of daily Giardia lamblia inactivation through the treatment plant. The procedure for developing a disinfection profile is contained in 40CFR141.172.

(28) "Distribution System" means all water lines up to the point of a meter. For unmetered systems distribution system includes all lines up to the customer's service tap.

(29) "Domestic or other non-distribution system plumbing problem" means a coliform contamination problem in a public water system with more than one service connection that is limited to the specific service connection from which the coliform-positive sample was taken.

(30) "Dose Equivalent" means the product of the absorbed dose from ionizing radiation and such factors as account for differences in biological effectiveness due to the type of radiation and its distribution in the body as specified by the International Commission on Radiological Units and Measurements (ICRU).

(31) “Dual sample set” is a set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an IDSE under the provisions of 1200-5-1-.37 and determining compliance with the TTHM and HAA5 MCLs under the provisions of 1200-5-1.38.

(32) "Effective corrosion inhibitor residual" for the purpose of the lead and copper rules only, means a concentration sufficient to form a passivating film on the interior walls of a pipe.

(33) "Engineer" means the person or firm who designed the public water system and conceived, developed, executed or supervised the preparation of the plan documents.

(34) “Enhanced coagulation” means the addition of sufficient coagulant for improved removal of disinfection byproduct precursors by conventional filtration treatment

(35) “Enhanced softening” means the improved removal of disinfection byproduct precursors by precipitative softening.

(36) “Filter profile” is a graphical representation of individual filter performance, based on continuous turbidity measurements or total particle counts versus time for an entire filter run, from startup to backwash inclusively, that includes an assessment of filter performance while another filter is being backwashed.

(37) "Filtration" means a process for removing particulate matter from water by passage through porous media.

(38) “Finished water” is water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals).

(39) "First draw sample" means a one-liter sample of tap water, for the purposes of the lead and copper rules, that has been standing in plumbing pipes at least 6 hours and is collected without flushing the tap.

(40) “Flocculation" means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable particles through gentle stirring by hydraulic or mechanical means.

(41) “Flowing stream” is a course of running water flowing in a definite channel.

(42) “GAC10” means granular activated carbon filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days, except that the reactivation frequency for GAC10 used as best available technology for compliance with disinfection byproducts shall be 120 days.

(43) “GAC20” means granular activated carbon filter beds with an empty-bed contact time of 20 minutes based on average daily flow and a carbon reactivation frequency of every 240 days.

(44) "Gross Alpha Particle Activity" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

(45) "Gross Beta Particle Activity" means the total radioactivity due to beta particle emission as inferred from measurements on a dry sample.

(46) “Ground water under the direct influence of surface water” means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as Giardia lamblia or Cryptosporidium, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Direct influence must be determined for individual sources in accordance with criteria established by the State. The State determination of direct influence may be based on site-specific measurements of water quality and/or documentation of well construction characteristics and geology with field evaluation.

(47) “Haloacetic acids (five) (HAA5)” mean the sum of the concentrations in milligrams per liter of the haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid), rounded to two significant figures after addition.

(48) "Halogen" means one of the chemical elements chlorine, bromine or iodine.

(49) “Human Consumption” - means the use of water that involves any drinking or ingestion of the water by humans, any human skin contact or food preparation where the food is not brought to boiling temperatures after contact with the water..

(50) "Initial compliance period" means the first full three-year compliance period which begins January 1, 1993. For public water systems having fewer than 150 service connections initial compliance period shall be January 2, 1996, for the following contaminants:

(a)	Antimony	(m)	endrin
(b)	Beryllium	(n)	glyphosate
(c)	Cyanide	(o)	oxamyl
(d)	Nickel	(p)	picloram
(e)	Thallium	(q)	simazine
(f)	dichloromethane	(r)	benzo(a)pyrene
(g)	1,2,4-trichlorobenzene	(s)	di(2ethylhexyl)adipate
(h)	1,1,2-trichloroethane	(t)	di(2ethylhexyl)phthalate
(i)	dalapon	(u)	hexachlorobenzene
(j)	dinoseb	(v)	hexachlorocyclopentadiene
(k)	diquat	(w)	2,3,7,8 TCDD
(l)	endothall		

(51) “Lake/reservoir” refers to a natural or man made basin or hollow on the earth’s surface in which water collects or is stored that may or may not have a current or single direction of flow.

(52) "Large water system" for the purpose of the lead and copper rule, means a water system that serves more than 50,000 persons.

(53) "Lead service line" means a service line made of lead which connects the water main to the building inlet and any lead pigtail, gooseneck or other fitting which is connected to such lead line.

(54) "Legionella" means a genus of bacteria, some species of which have caused a type of pneumonia called Legionnaires Disease.

(55) “Locational running annual average (LRAA)” is the average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.

(56) "Man-Made Beta Particle and Photon Emitter" means all radionuclides emitting beta particles and/or photons listed in "Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure, NBS Handbook 69", except the daughter products of thorium-232, uranium-235 and uranium-238.

(57) "Maximum Contaminant Level" means the maximum permissible level of a contaminant in water which is delivered at the free flowing outlet of the ultimate user of a public water system, except in the case of turbidity where the maximum permissible level is measured at the point of entry to the distribution system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition.

(58) “Maximum residual disinfectant level (MRDL)” means a level of a disinfectant added for water treatment that may not be exceeded at the consumer’s tap without an unacceptable possibility of adverse health effects. For chlorine and chloramines, a PWS is in compliance with the MRDL when the running annual average of monthly averages of samples taken in the distribution system, computed quarterly, is less than or equal to the MRDL. For chlorine dioxide, a PWS is in compliance with the MRDL when daily samples are taken at the entrance to the distribution system and no two consecutive daily samples exceed the MRDL. MRDLs are enforceable in the same manner as maximum contaminant levels under Section 1412 of the Safe Drinking Water Act. There is convincing evidence that addition of a disinfectant is necessary for control of waterborne microbial contaminants. Notwithstanding the MRDLs, operators may increase residual disinfectant levels of chlorine or chloramines (but not chlorine dioxide) in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as distribution line breaks, storm runoff events, source water contamination, or cross-connections.

(59) "Maximum Total Trihalomethane Potential (MTP)" means the maximum concentration of total trihalomethanes produced in a given water containing a disinfectant residual after 7 days at a temperature of 25°C or above.

(60) "Medium-size water system" for the purpose of the lead and copper rule means a water system that serves greater than 3,300 and less than or equal to 50,000 persons.

(61) “Membrane filtration” is a pressure or vacuum driven separation process in which particulate matter larger than 1 micrometer is rejected by an engineered barrier, primarily through a size exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test. This definition includes the common membrane technologies of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.

(62) "Near the first service connection" means at one of the twenty percent of all service connections in the entire system that are nearest the water supply treatment facility, as measured by the water transport time within the distribution system.

(63) "Non-Community Water System" means a public water system that is not a community water system.

(64) "Non-Transient Non-Community Water System" or NTNCWS" means a non-community water system that regularly serves at least twenty-five (25) of the same persons over six (6) months per year.

(65) "Optimal corrosion control treatment" for the purpose of lead and copper rule only means the corrosion control treatment that minimizes the lead and copper concentrations at user's taps while insuring that the treatment does not cause the water system to violate any primary drinking water regulation.

(66) "Person" means any individual, corporation, company, association, partnership, State, municipality, utility district, water cooperative, or Federal agency.

(67) "Picocurie" (pCi) means that quantity of radioactive material producing 2.22 nuclear transformations per minute.

(68) "Plan Documents" mean reports, proposals, preliminary plans, survey and basis of design data, general and detailed construction plans, profiles, specifications and all other information pertaining to public water system planning.

(69) “Plant intake” refers to the works or structures at the head of a conduit through which water is diverted from a source (e.g., river or lake) into the treatment plant.

(70) "Point of disinfectant application" is the point where the disinfectant is applied and water downstream of that point is not subject to recontamination by surface water runoff.

(71) "Point-of-Entry Treatment Device" (POE) means a device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.

(72) "Point-of-Use Treatment Device" (POU) means a treatment device applied to a single tap used for the purpose of reducing contaminants in drinking water at that one tap.

(73) ‘Presedimentation” is a preliminary treatment process used to remove gravel, sand and other particulate material from the source water through settling before the water enters the primary clarification and filtration processes in a treatment plant.

(74) "Primary Drinking Water Regulation" means a regulation promulgated by the Department which:

(a) applies to public water systems;

(b) specifies contaminants which, in the judgment of the Department, may have any adverse effect on the health of persons;

(c) specified for each such contaminant either;

1. a <u>maximum contaminant level</u>, if, in the judgment of the Department, it is economically and technologically feasible to ascertain the level of such contaminant in water in public water systems, or

2. if, in the judgment of the Department, it is not economically or technologically feasible to so ascertain the level of such contaminant, each <u>treatment technique</u> known to the Department which leads to a reduction in the level of such contaminant sufficient to satisfy the requirements of Regulations 1200-5-1-.06; and

(d) contains criteria and procedures to assure a supply of drinking water which dependably complies with such maximum contaminant levels; or treatment

techniques including quality control and testing procedures to insure compliance with such levels and to insure proper operation and maintenance of the system, and requirements to (i) the minimum quality of water which may be taken into the system and (ii) siting for new facilities for public water systems.

(75) "Public Water System" means a system for the provision of piped water for human consumption if such serves 15 or more connections or which regularly serves 25 or more individuals daily at least 60 days out of the year and includes:

(a) any collection, treatment, storage or distribution facility under control of the operator of such system and used primarily in connection with such system; and

(b) any collection or pre-treatment storage facility not under such control which is used primarily in connection with such system.

The population of a water system shall be determined by actual count or by multiplying the household factor by the number of connections in the system. The household factor shall be taken from the latest federal census for that county or city.

(76) "Rem" means the unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. A "millerem (mrem)" is 1/1000 of a rem.

(77) "Repeat compliance period" means any subsequent compliance period after the initial compliance period.

(78) "Residual disinfectant concentration" ("C" in CT calculations) means the concentration of disinfectant measured in mg/l in a representative sample of water.

(79) "Safe Drinking Water Act" means the Federal law codified in 42 United States Code 300f et. seq., Public Law 93-523, dated December 16, 1974 and subsequent amendments..

(80) "Sanitary Survey" means an on-site review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such sources, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

(81) "Secondary Drinking Water Regulation" mean a regulation promulgated by the Department which applies to public water systems and which specifies the maximum contaminant levels which, in the judgment of the Department are requisite to protect the public welfare. Such regulations may apply to any contaminant in drinking water

(a) which may adversely affect the odor or appearance of such water and consequently may cause the persons served by the public water system providing such water to discontinue its use, or

(b) which may otherwise adversely affect the public welfare. Such regulations may vary according to geographic and other circumstances.

(82) "Sedimentation" means a process for removal of solids before filtration by gravity or separation.

(83) "Service line sample" means a one-liter sample of water collected in accordance with 1200-5-1-.33(7)(b)3., that has been standing for at least 6 hours in a service line.

(84) "Single family structure" for the purpose of lead and copper rules means a building constructed as a single-family residence that is currently used as either a residence or a place of business.

(85) "Slow sand filtration" means a process involving passage of a raw water through a bed of sand at low velocity (generally less than 0.4 m/h) resulting in substantial particulate removal by physical and biological mechanisms.

(86) "Small water system" for the purpose of the lead and copper rules only, means a water system that serves 3,300 or fewer persons.

(87) “Subpart H systems” means public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to the requirements 1200-5-1-.31, .39, and 1200-5-1-.17.

(88) "Supplier of Water" means any person who owns or operates a public water system.

(89) "Surface water" means all water which is open to the atmosphere and subject to surface runoff.

(90) “SUVA” means Specific Ultraviolet Absorption at 254 nanometers (nm), an indicator of the humic content of water. It is a calculated parameter obtained by dividing a sample’s ultraviolet absorption at a wavelength of 254 nm (UV 254/ (in m) by its concentration of dissolved organic carbon (DOC) (in mg/L).

(91) "System with a single service connection" means a system which supplies drinking water to consumers via a single service line.

(92) "Too numerous to count" means that the total number of bacterial colonies exceeds 200 on a 47 millimeter diameter membrane filter used for coliform detection.

(93) “Total Organic Carbon (TOC)” means total organic carbon in mg/L measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures.

(94) "Total trihalomethane" (TTHM) means the sum of concentration in milligrams per liter of the trihalomethane compounds-trihalomethane (chloroform), dibromochloromethane, bromodichloromethane and tribomomethane (bromoform), rounded to two significant figures.

(95) “Transient Non-Community Water System” or “TNCWS” means a non-community water system that regularly serves at least twenty-five (25) individuals daily at least sixty (60) days out of the year. A transient non-community water system is a public water supply system that generally serves a transient population such as hotels, motels, restaurants, camps, service stations churches, industry, and rest stops

(96) "Trihalomethane" (THM) means one of the family of organic compounds, named as derivatives of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

(97) “Two-stage lime softening” is a process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes.

(98) “Uncovered finished water storage facility” is a tank, reservoir, or other facility used to store water that will undergo no further treatment except residual disinfection and is open to the atmosphere.

(99) “Viable Water System” means a public water system which has the commitment and the financial, managerial and technical capacity to consistently comply with the Tennessee Safe Drinking Water Act and these regulations.

(100) "Virus" means a virus of fecal origin which is infectious to humans by waterborne transmission.

(101) “Waterborne disease outbreak" means a significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment, as determined by the appropriate local or State agency.

(102) “Wholesale system” is a public water system that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

Rulemaking Authority: T.C.A. Sections 68-221-704
Substantative Authority: T.C.A. 68-221-701 et. seq.

Amendments

Subparagraphs (a) and (b) of Paragraph (6) of Rule 1200-5-1-.06 Maximum Contaminant Levels are amended by deleting the existing language in its entirety and substituting the following language so that as amended subparagraphs shall read:

(a) Bromate and chlorite. The maximum contaminant levels (MCLs) for bromate and chlorite are as follows:

Disinfection by-product	MCL (mg/L)
Bromate	0 .010
Chlorite	1 .0

1. Compliance dates for CWSs and NTNCWSs. Subpart H systems serving 10,000 or more persons must comply with this paragraph (a) beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this paragraph (a) beginning January 1, 2004.

2. The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for bromate and chlorite identified in this paragraph (a):

Disinfection by-product	Best available technology
Bromate	Control of ozone treatment process to reduce production of bromate
Chlorite	Control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels

(b) TTHM and HAA5.

1. Subpart L— Running Annual Average compliance (1200-5-1-.36)

(i) Compliance dates. Subpart H systems serving 10,000 or more persons must comply with subparagraph (b)1 beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this subparagraph (b)1 beginning January 1, 2004. All systems must comply with these MCLs until the date specified for Locational Running Annual Average (subpart V) compliance in 1200-5-1-.38.

Disinfection by-product	MCL (mg/L)
Total trihalomethanes (TTHM)	0.080
Haloacetic acids (five) (HAA5)	0.060

(ii) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for TTHM and HAA5 identified in this subparagraph (b)1.

Disinfection by-product	Best available technology
Total trihalomethanes (TTHM) and Haloacetic acids (five) (HAA5)	Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant

2. Subpart V—LRAA compliance (1200-5-1-.38)

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(i) Compliance dates. The subpart V MCLs for TTHM and HAA5 must be complied with as a locational running annual average (LRAA) at each monitoring location beginning the date specified for subpart V compliance in 1200-5-1-.38(1)(c).

Disinfection by-product	MCL (mg/L)
Total trihalomethanes (TTHM)	0.080
Haloacetic acids (five) (HAA5)	0.060

(ii) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for TTHM and HAA5 identified in subparagraph (b)2 for all systems that disinfect their source water:

Disinfection by-product	Best available technology
Total trihalomethanes (TTHM) and Haloacetic acids (five) (HAA5)	Enhanced coagulation or enhanced softening or GAC10; nanofiltration and with a molecular weight cutoff of equal to or less than 1000 Daltons; or GAC20

(iii) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for TTHM and HAA5 identified in subparagraph (b)2 for consecutive systems and applies only to the disinfected water that consecutive systems buy or otherwise receive:

Disinfection by-product	Best available technology
Total trihalomethanes (TTHM) and Haloacetic acids (five) -(HAA5).	Systems serving 10,000 or more: Improved distribution system and storage tank management to reduce residence time, plus the use of chloramines for disinfectant residual maintenance Systems serving <10,000: Improved distribution system and storage tank management to reduce residence time

Rulemaking Authority: T.C.A. Sections 68-221-704
Substantative Authority: T.C.A. 68-221-701 et. seq.

Amendments

Rule 1200-5-1-.14 Laboratory Certification is amended by the deleting the existing language in its entirety and substituting the following language so that as amended the subparagraphs shall read:

1200-5-1-.14 Laboratory Certification.

(1) General

(a) For the purpose of determining compliance with maximum contaminant levels set forth in this chapter, analyses of samples may be considered only if they have been analyzed by a laboratory certified by the Department. Laboratories which are certified by the Department are designated "state-certified laboratories." Analysis for turbidity, free chlorine residual, temperature, pH, alkalinity, calcium, conductivity, orthophosphate, daily chlorite, and silica may be performed by persons approved by the Department. Approved methodology must be used.

(b) The Tennessee Laboratory Certification Program is established for the purpose of evaluating laboratories to determine technical capability to analyze for one or more groups of the contaminants, disinfectant residuals, disinfection byproducts and disinfectant precursors listed in Sections 1200-5-1-.06 through 1200-5-1-.10, Sections 1200-5-1-.12, 1200-5-1-.21 through 1200-5-1-.28, and 1200-5-1-.36 through .39 of this chapter. Designation of Department laboratory certification officer(s) shall be from those experienced professional staff members assigned to the Department of Environment and Conservation Division of Water Supply, and certified by the U.S. Environmental Protection Agency. Certification Officer(s) shall supervise the certification program.

(c) A laboratory desiring certification in microbiological and/or chemical analysis shall make written application to the Department of Environment and Conservation, Division of Water Supply. The applicant shall indicate those group(s) of contaminants for which it seeks certification:

(i)	Inorganic chemicals	(vi)	Volatile Organic Chemicals other
(ii)	Organic chemicals		than trihalomethanes
(iii)	Disinfection Byproducts	(vii)	Microbiological
(iv)	Radiochemicals	(viii)	Asbestos
(v)	Corrosivity	(ix)	Polychlorinated Biphenyls (PCBs)
		(x)	Chlorite and Bromate

(d) The laboratory shall upon request supply to the Department all information requested concerning its equipment, facilities, data, and the qualifications of its laboratory staff. Certified laboratories must have an on-site audit conducted every three years by the certification officer or his/her designee. Interim Certification status may be granted to a laboratory to extend a laboratories certification for a maximum of ninety days.

(e) A laboratory desiring certification will arrange for a National Institute of Standards and Technology (NIST) telephone number 301-975-6478, 100 Bureau Drive, Stop 3460, Gaithersburg, Maryland 30899-3460 or internet at www.nist.gov or National Environmental Laboratory Accreditation Conference (NELAC) at www.epa.gov/ttn/nelac approved vendor to send performance evaluation samples to the laboratory for testing pursuant to its proficiency testing program. The laboratory's performance in correctly evaluating such sample(s) will be sent to both the laboratory and to the certification officer. All direct costs for the performance evaluation samples will be born by the laboratory requesting certification.

(f) The certification officer shall review the written report of the laboratory performance evaluation and together with his review of the written application shall determine the certification ranking.

(g) Certified laboratories must maintain all records and correspondence used to determine compliance with the requirements of these Rules for a period of not less than six (6) years. Adequate information must be available to reconstruct results for compliance and performance evaluation (PE) samples. This includes all raw data, calculations, and quality control data. Electronic data must be backed up by protected tape, hard disk, or other method approved by the Department. Water system clients should be notified before disposing of any records so they may request copies if needed. Performance evaluation samples shall be analyzed at least every twelve months.

(h) Certified Laboratories shall comply with all requirements set forth in the Latest Edition of EPA *Manual for the Certification of Laboratories Analyzing Drinking Water* except where those requirements differ from the requirements set forth in this chapter.

(2) In order for a laboratory to be certified by the Department:

(a) It must have a written quality assurance (QA) plan which addresses the following items:

1. Laboratory organization and responsibility.
2. Process used to identify clients' Data Quality Objectives.
3. SOPs with dates of last revision.
4. Field sampling procedures.
5. Laboratory sample receipt and handling procedures.
6. Instrument calibration procedures
7. Analytical procedures.
8. Data reduction, validation, reporting and verification.
9. Type of quality control (QC) checks and the frequency of their use.
10. List schedules of internal and external system and data quality audits and inter - laboratory comparisons.
11. Preventive maintenance procedures and schedules.
12. Corrective action contingencies.
13. Record keeping procedures.

(i) If a particular item is not relevant, the QA plan should state this and provide a brief explanation.

(ii) All laboratories analyzing drinking water compliance samples must adhere to any required QC procedures specified in the approved method. Documentation for many of the listed QA plan items may be made by reference to appropriate sections of the latest edition of *EPA Manual for the Certification of Laboratories Analyzing Drinking Water*, the laboratory's standard operating procedures, (SOPs) or other literature (e.g., promulgated methods, *Standard Methods for the Examination of Water and Wastewater*, etc.). The QA Plan should be updated at least annually.

(b) Complete the performance evaluation samples as described in paragraph (9) of this section.

(c) In addition to any costs of water supply performance evaluation samples, on an annual basis and with each application for certification or recertification, all laboratories except those operated by public water suppliers shall convey to the Department, Division of Water Supply, payment for the activities necessary for each group of contaminants it desires certification or recertification. The fee schedule is as follows:

	CONTAMINANT	FEE IN DOLLARS
1.	Inorganic Trace Metals and Sodium, Nitrite, Nitrate, Fluoride, Sulfate, Cyanide and Corrosivity	$250.00
2.	Organics (Pesticides and Herbicides)	250.00
3.	Trihalomethanes, special hydrocarbons and Volatile Organic Chemicals and Haloacetic acids	250.00
4.	Radiochemistry	250.00
5.	EDB and DBCP	50.00
6.	Vinyl Chloride	50.00
7.	Microbiological (Total Coliform, Heterotropic Plate Count, Fecal Coliform)	250.00
8.	Turbidity	250.00
9.	Asbestos	250.00
10.	Polychlorinated Biphenyls(PCB)	250.00
11.	Chlorite	50.00
12.	Bromate	50.00
13.	Total Organic Carbon	100.00

(d) Certification fees shall be retained by the state even if the laboratory applying for certification does not qualify for certification.

(e) If the certification fee is not paid within 30 days after the receipt of the invoice, certification of the laboratory is automatically revoked.

(f) The reinstatement fee for a laboratory that fails to pay its certification fee by the invoice due date shall be $500.00 in addition to the fees specified in subparagraph (c).

(3) Ranking Scheme of Laboratories - Based upon a review of the written application, the facts determined from any inspection, and the results of a laboratory performance evaluation, a certification officer may classify a laboratory as follows for the particular group(s) of contaminants for which it seeks certification:

(a) Certified - A laboratory that meets the minimum requirements as set forth in these Rules.

(b) Provisionally Certified - A laboratory which has deficiencies but can still produce valid analytical data.

(c) Not Certified - A laboratory which possesses major deficiencies such that it cannot consistently produce valid analytical data in order to determine compliance with the maximum contaminant level. Analytical data will not be accepted from a laboratory with this ranking.

(d) Interim Certification - interim certification may be granted in certain circumstances when it is impossible or unnecessary to perform an on-site audit. Interim certification status may be granted if, for example, the Certification Officer determines that the laboratory has the appropriate instrumentation, is using the approved methods, has adequately trained personnel to perform the analyses, and has satisfactorily analyzed PT samples, if available, for the contaminants in question. The Certification Officer should perform an on-site audit as soon as possible but no later than three years. An example of a situation where this type of certification is warranted would be a laboratory that has requested certification for the analysis of additional analytes that involve a method for which it already has certification.

(4) Downgrading Certification Status - A laboratory certified to perform analyses may be downgraded to a Provisionally Certified status for a particular parameter, or for one or more groups of contaminants for which it has been certified for any one of the following reasons:

(a) Failure to analyze a set of performance evaluation samples within established acceptance limits described in paragraph (9) of this rule. (If more than one concentration of a particular contaminant was provided for analysis, the laboratory must analyze all concentrations provided except where otherwise stated.)

(b) Failure to notify the Department within 30 days of any changes either in personnel, equipment, or laboratory location which may impair analytical capability.

(c) Failure to maintain the minimum required standard of quality as contained in the most recent version of the EPA Manual for the Certification of Laboratory Analyzing Drinking Water as determined by an on-site evaluation by a Department representative.

(d) During a provisional status period, which may last for up to one year plus any extension period pending proceedings for revocation of its certification, the laboratory may continue to analyze samples for compliance purposes, but it must notify its clients of its downgraded status in writing on all reports.

(e) Failure to report compliance data to the public water system or the state in a timely manner. Data that may cause the system to exceed a MCL shall be reported as soon as possible to the system and to the state.

(5) Revoking Certification Status - A laboratory certified to perform analyses may be downgraded from a Certified or a Provisionally Certified status to a Not Certified status for a particular parameter, or for one or more groups of contaminants for which it has been certified, including but not limited to any of the reasons listed in subparagraphs below. Commercial laboratories must notify their public water system customers of the change in certification status by mail within 45 days of a downgrade in status by the Department and retain copies of such notice for five years.

(a) Failure to analyze an initial and a follow-up or cross check performance evaluation sample within established acceptance limits.

(b) Failure to correct identified deviations (including continued use of unapproved methods and equipment) within the time specified by the Department.

(c) Reporting as data derived from its own laboratory analysis, that data obtained from analyses of the sample(s) performed by another laboratory.

(d) Falsification or inaccurate reporting of analytical data.

(e) Failure to report to the Department on departmental forms analytical results within ten (10) days of the analysis. Forms may be obtained from the Division of Water Supply. A certified laboratory shall submit results of its analyses to both the appropriate Department's field office and the Department's central office on forms furnished by the Department.

(f) Failure to perform the analysis within the time period prescribed by the analytical procedure. However, the time period shall not be more than thirty (30) days from the sample collection date, except for lead and copper tap samples collected pursuant to 1200-5-1-.33.

(g) Failure to notify its drinking water customers of any downgrade or revocation of its certification status and to keep records of the notice to customers.

(h) Failure of the laboratory to reject any sample taken for compliance purposes that does not meet acceptable criteria for the type container and preservative, maximum holding time, chain of custody, proper sample collection and transport, and sample report form that contains the location, date, time of collection, collector's name, preservative added, and

other special remarks concerning the sample. Indelible ink shall be used for completing the sample report form.

(i) Failure of the Laboratory Director to notify the party responsible for collecting the sample that improper sampling technique, container, transport, holding time, method preservative or documentation was used.

(j) Failure to provide written sampling procedures with sample containers sent to customers for collecting drinking water samples.

(k) Failure to meet the method detection limits.

(l) Failure to maintain all data necessary to reconstruct analytical results reported for compliance samples.

(6) Procedure for Revocation

(a) The State, Department, Division of Water Supply or the certification officer shall notify the laboratory by certified mail of its intent to revoke certification.

(b) If the local laboratory objects to the determination to revoke certification, the laboratory shall submit a written notice of appeal to the Department within thirty (30) days after issuance of the notice of intent to revoke certification. The notice of appeal will be referred to the Water Quality Control Board. The Board will set a hearing date and conduct proceedings in accordance with the Uniform Administrative Procedures Act, Chapter 5 of Title 4. If no notice of appeal is so filed, certification will be revoked.

(c) The notice of appeal shall set forth the grounds and reasons for objection and shall ask for a hearing before the Board. It shall be signed by a duly authorized representative of the laboratory such as the president/owner of a commercial laboratory, or the mayor, utility manager, president, or laboratory supervisor in the case of a municipal or utility district laboratory.

(d) If the Board modifies or sets aside the determination of the Department, the Department will reevaluate the local laboratory within sixty (60) days of issuance of the decision by the Board.

(7) Reinstatement of Certification - Certification of a laboratory will be reinstated when it demonstrates to the Department that the deficiencies which resulted in provisional certification or revocation have been corrected. Such demonstration may result from an on-site evaluation and/or a successful analysis of samples on the next regularly scheduled performance evaluation.

(8) Reciprocity of Certified Laboratories - The Department may authorize acceptance of analyses from laboratories certified by other states or by the U. S. Environmental Protection Agency. Authorization will be granted on a reciprocal basis for laboratories from those states which accept Tennessee laboratory certification. Laboratories desiring Department approval of their certification from the U.S. E.P.A. or from another state must submit to the Department copies of all correspondence pertaining to the grant of certification, including the results of any performance evaluation sample analyses.

(9) Proficiency Evaluation (PE) Samples

(a) The following are required for each analyte for which a laboratory is certified: In order to receive and maintain full certification for an analyte, the laboratory must analyze PE samples (if available) acceptable to the Department at least once a year for each analyte and by each method used to analyze compliance samples. Results from analysis of the PE samples must be within the acceptable limits set forth in this chapter. The laboratory must document the corrective actions taken when a PE sample is analyzed unsuccessfully. A

copy of this documentation must be available for review by the certification officer. A make up PE sample must be successfully analyzed within three months of being notified that a PE sample was not acceptable.

(b) Excluding vinyl chloride, the laboratory may be certified for all VOCs if they successfully analyze at least 80% of the regulated VOCs. The 80% Rule does not apply to the trihalomethanes (THM) or haloacetic acids (HAAs). Laboratories are still certified for total THMs and HAA5 but each THM and HAA concentration must be reported, evaluated and passed individually to pass the PT sample. If a laboratory fails one THM or HAA, it cannot be certified for TTHMs or HAA5, but must analyze another PT sample and pass all of the THMs or HAA's in a PT sample to be certified to analyze compliance monitoring samples for total trihalomethanes or total haloacetic acids.

The following table summarizes the 80% Rule.

Analyte(s)	PT Success Requirement
Vinyl Chloride	100%
20 VOCs	80% *
4 THMs	100%
5 HAA5s	100%

*A lab will not maintain certification for analyte(s) which it repeatedly fails.

Rulemaking Authority: T.C.A. Sections 68-221-704
Substantative Authority: T.C.A. 68-221-701 et. seq.

Amendments

Rule 1200-5-1-.19 Notification of Customers is amended by addition of paragaph (11) so that as amended it shall read:

(11) Special notice for repeated failure to conduct monitoring of the source water for *Cryptosporidium* and for failure to determine bin classification or mean *Cryptosporidium* level.

(a) When is the special notice for repeated failure to monitor to be given? The owner or operator of a community or non-community water system that is required to monitor source water under 1200-5-1-.38(2) must notify persons served by the water system that monitoring has not been completed as specified no later than 30 days after the system has failed to collect any 3 months of monitoring as specified in 1200-5-1-.38(2)(c). The notice must be repeated as specified in 1200-5-1-.19(3)(b).

(b) When is the special notice for failure to determine bin classification or mean *Cryptosporidium* level to be given? The owner or operator of a community or non-community water system that is required to determine a bin classification under 1200-5-1-.38(11), or to determine mean *Cryptosporidium* level under 1200-5-1-.38(13), must notify persons served by the water system that the determination has not been made as required no later than 30 days after the system has failed report the determination as specified in 1200-5-1-.38(11)(e) or 1200-5-1-.38(13)(a), respectively. The notice must be repeated as specified in 1200-5-1-.19(3)(b). The notice is not required if the system is complying with a State-approved schedule to address the violation.

(c) What is the form and manner of the special notice? The form and manner of the public notice must follow the requirements for a Tier 2 public notice prescribed in 1200-5-1-.19(3)(c). The public notice must be presented as required in 1200-5-1-.19(5)(c).

(d) What mandatory language must be contained in the special notice? The notice must contain the following language, including the language necessary to fill in the blanks.

1. The special notice for repeated failure to conduct monitoring must contain the following language:

   We are required to monitor the source of your drinking water for *Cryptosporidium.* Results of the monitoring are to be used to determine whether water treatment at the (treatment plant name) is sufficient to adequately remove *Cryptosporidium* from your drinking water. We are required to complete this monitoring and make this determination by (required bin determination date). We ''did not monitor or test'' or ''did not complete all monitoring or testing'' on schedule and, therefore, we may not be able to determine by the required date what treatment modifications, if any, must be made to ensure adequate *Cryptosporidium* removal. Missing this deadline may, in turn, jeopardize our ability to have the required treatment modifications, if any, completed by the deadline required, (date).

   For more information, please call (name of water system contact) of (name of water system) at (phone number).

2. The special notice for failure to determine bin classification or mean Cryptosporidium level must contain the following language:

   We are required to monitor the source of your drinking water for Cryptosporidium in order to determine by (date) whether water treatment at the (treatment plant name) is sufficient to adequately remove Cryptosporidium from your drinking water. We have not made this determination by the required date. Our failure to do this may jeopardize our ability to have the required treatment modifications, if any, completed by the required deadline of (date). For more information, please call (name of water system contact) of (name of water system) at (phone number).

3. Each special notice must also include a description of what the system is doing to correct the violation and when the system expects to return to compliance or resolve the situation.

Rulemaking Authority: T.C.A. Sections 68-221-704
Substantative Authority: T.C.A. 68-221-701 et. seq.

Amendments

Appendix A of Rule 1200-5-1-.19 Notification of Customers is amended by deleting the existing language in its entirety and substituting the following language so that as amended it shall read:

APPENDIX A TO 1200-5-1-.19.---NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE[1]

Contaminant	MCL/MRDL/TT violations[2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
I. Violations of National Primary Drinking Water Regulations (NPDWR):[3]				
A. Microbiological Contaminants				
1. Total coliform	2	1200-5-1-.06(4)(a)	3	1200-5-1-.07(1)-(2)
2. Fecal coliform/E.coli	1	1200-5-1-.06(4)(b)	[4]1,3	1200-5-1-.07(1)-(2)
3. Turbidity MCL	2	1200-5-1-.06(4)(a)	3	1200-5-1-.08
4. Turbidity MCL(average of 2 days' samples > 2 NTU)	[5]2,1	1200-5-1-.06(3)(b)	3	1200.-5-1-.08
5. Turbidity (for TT violations resulting from a Single exceedance of maximum allowable turbidity level)	[6]2,1	1200-5-1-.31(2)(a) 1200-5-1-.31(2)(a) 1200-5-1-.31(4)(a)2. 1200-5-1-.31(4)(b)2. 1200-5-1-.31(4)(b)2. 1200-5-1-.31(4)(b)2.	3	1200-5-1-.31 1200-5-1-.31 1200-5-1-.31 1200-5-1-.31
6. Surface Water Treatment Rule violations other than violations resulting from single exceedance of max. allowable turbidity level (TT) [1200-5-1-.31(4)]	2	1200-5-1-.31(1)-(4)	3	1200-5-1-.31(4)
7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max turbidity level (TT) [1200-5-1-.31(4)	[7]2	1200-5-1-.31(1)-(4)	3	1200-5-1-.31(4)®
8. Filter Backwash Recycling Rule Violations	2	1200-5-1-.31(9)®	3	1200-5-1-/31(9)(b) and (d)
9.Long term 1 Enhanced Surface Water Treatment Rule Violations	2	1200-5-1-.31(4)	3	1200-5-1-.31(6)
10. LT2ESWTR violation	2	1200-5-1-.39(11)-(21)	[22]2,3	1200-5-1-.39(2)-(6) 1200-5-1-.39(9)-(10)
B. Inorganic Chemicals (IOCs)				
1. Antimony	2	1200-5-1-.06(1)(b)1.	3	1200-5-1-.09
2. Arsenic	2	[8]1200-5-1-.06(1)(b)2.	3	[11]1200-5-1-.09
3. Asbestos (fibers >10 µm)	2	1200-5-1-.06(1)(b)3.	3	1200-5-1-.09
4. Barium	2	1200-5-1-.06(1)(b)5.	3	1200-5-1-.09
5. Beryllium	2	1200-5-1-.06(1)(b)4.	3	1200-5-1-.09
6. Cadmium	2	1200-5-1-.06(1)(b)6.	3	1200-5-1-.09
7. Chromium (total)	2	1200-5-1-.06(1)(b)7.	3	1200-5-1-.09
8. Cyanide	2	1200-5-1-.06(1)(b)8.	3	1200-5-1-.09
9. Fluoride	2	1200-5-1-.06(1)(b)9.	3	1200-5-1-.09
10. Mercury (inorganic)	2	1200-5-1-.06(1)(b)10.	3	1200-5-1-.09
11. Nickel	2	1200-5-1-.06(1)(b)11.	3	1200-5-1-.09
12. Nitrate	1	1200-5-1-.06(1)(b)12.	[12]1,3	1200-5-1-.09
13. Nitrite	1	1200-5-1-.06(1)(b)13.	[12]1,3	1200-5-1-.09
14. Total Nitrate and Nitrite	1	1200-5-1-.06(1)(b)14.	3	1200-5-1-.09
15. Selenium	2	1200-5-1-.06(1)(b)15.	3	1200-5-1-.09
16. Thallium	2	1200-5-1-.06(1)(b)16.	3	1200-5-1-.09
C. Lead and Copper Rule (Action Level for lead is 0.015 mg/L, for copper is 1.3 mg/L)				
1. Lead and Copper Rule (TT)	2	1200-5-1-.33(1)-(6)	3	1200-5-1-.33
D. Synthetic Organic Chemicals (SOCs)				
1. 2,4-D	2	1200-5-1-.06(2)(a)6.	3	1200-5-1-.10
2. 2,4,5-TP (Silvex)	2	1200-5-1-.06(2)(a)14.	3	1200-5-1-.10
3. Alachlor	2	1200-5-1-.06(2)(a)1.	3	1200-5-1-.10
4. Atrazine	2	1200-5-1-.06(2)(a)2.	3	1200-5-1-.10
5. Benzo(a)pyrene (PAHs)	2	1200-5-1-.06(2)(a)16.	3	1200-5-1-.10
6. Carbofuran	2	1200-5-1-.06(2)(a)3.	3	1200-5-1-.10
7. Chlordane	2	1200-5-1-.06(2)(a)4.	3	1200-5-1-.10
8. Dalapon	2	1200-5-1-.06(2)(a)17.	3	1200-5-1-.10
9. Di (2-ethylhexyl) adipate	2	1200-5-1-.06(2)(a)18.	3	1200-5-1-.10
10. Di (2-ethylhexyl) phthalate	2	1200-5-1-.06(2)(a)19.	3	1200-5-1-.10
11. Dibromochloropropane	2	1200-5-1-.06(2)(a)20.	3	1200-5-1-.10
12. Dinoseb	2	1200-5-1-.06(2)(a)20.	3	1200-5-1-.10
13. Dioxin (2,3,7,8-TCDD)	2	1200-5-1-.06(2)(a)29.	3	1200-5-1-.10
14. Diquat	2	1200-5-1-.06(2)(a)21.	3	1200-5-1-.10
15. Endothall	2	1200-5-1-.06(2)(a)22.	3	1200-5-1-.10

APPENDIX A TO 1200-5-1-.19.---NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE[1]

Contaminant	MCL/MRDL/TT violations[2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
16. Endrin	2	1200-5-1-.06(2)(a)30.	3	1200-5-1-.10
17. Ethylene Dibromide	2	1200-5-1-.06(2)(a)7.	3	1200-5-1-.10
18.Glyphospate	2	1200-5-1-.06(2)(a)23.	3	1200-5-1-.10
19. Heptachlor	2	1200-5-1-.06(2)(a)8.	3	1200-5-1-.10
20. Heptachlor epoxide	2	1200-5-1-.06(2)(a)9.	3	1200-5-1-.10
21. Hexachlorobenzene	2	1200-5-1-.06(2)(a)24.	3	1200-5-1-.10
22. Hexachlorocyclo-pentadiene	2	1200-5-1-.06(2)(a)25.	3	1200-5-1-.10
23. Lindane	2	1200-5-1-.06(2)(a)10.	3	1200-5-1-.10
24. Methoxchlor	2	1200-5-1-.06(2)(a)11.	3	1200-5-1-.10
25. Oxamyl (Vydate)	2	1200-5-1-.06(2)(a)26.	3	1200-5-1-.10
26. Pentachlorophenol	2	1200-5-1-.06(2)(a)15.	3	1200-5-1-.10
27. Picloram	2	1200-5-1-.06(2)(a)27.	3	1200-5-1-.10
28. Polychlorinated biphenyls (PCBs)	2	1200-5-1-.06(2)(a)12.	3	1200-5-1-.10
29. Simazine	2	1200-5-1-.06(2)(a)28.	3	1200-5-1-.10
30. Toxaphene	2	1200-5-1-.06(2)(a)13.	3	1200-5-1-.10
E. Volatile Organic Chemicals (VOCs)				
1. Benzene	2	1200-5-1-.25(2)(e)	3	1200-5-1-.26
2. Carbon tetrachloride	2	1200-5-1-.25(2)(b)	3	1200-5-1-.26
3. Chlorobenzene (monochlorbenzene)	2	1200-5-1-.25(2)(l)	3	1200-5-1-.26
4. o-Dichlorobenzene	2	1200-5-1-.25(2)(m)	3	1200-5-1-.26
5. p-Dichlorobenzene	2	1200-5-1-.25(2)(h)	3	1200-5-1-.26
6. 1,2-Dichloroethane	2	1200-5-1-.25(2)(d)	3	1200-5-1-.26
7. 1,1-Dichloroethylene	2	1200-5-1-.25(2)(f)	3	1200-5-1-.26
8. cis-1,2-Dichloroethylene	2	1200-5-1-.25(2)(i)	3	1200-5-1-.26
9. trans-1,2-Dichloroethylene	2	1200-5-1-.25(2)(q)	3	1200-5-1-.26
10. Dichloromethane	2	1200-5-1-.25(2)(s)	3	1200-5-1-.26
11. 1,2-Dichloropropane	2	1200-5-1-.25(2)(j)	3	1200-5-1-.26
12. Ethylbenzene	2	1200-5-1-.25(2)(k)	3	1200-5-1-.26
13. Styrene	2	1200-5-1-.25(2)(n)	3	1200-5-1-.26
14. Tetrachloroethylene	2	1200-5-1-.25(2)(o)	3	1200-5-1-.26
15. Toluene	2	1200-5-1-.25(2)(p)	3	1200-5-1-.26
16. 1,2,4-Trichlorobenzene	2	1200-5-1-.25(2)(t)	3	1200-5-1-.26
17. 1,1,1-Trichloroethane	2	1200-5-1-.25(2)(g)	3	1200-5-1-.26
18. 1,1,2-Trichloroethane	2	1200-5-1-.25(2)(w)	3	1200-5-1-.26
19. Trichloroethylene	2	1200-5-1-.25(2)(a)	3	1200-5-1-.26
20. Vinyl chloride	2	1200-5-1-.25(2)(c)	3	1200-5-1-.26
21. Xylenes (total)	2	1200-5-1-.25(2)(r)	3	1200-5-1-.26
F. Radioactive Contaminants				
1. Beta/photon emitters	2	1200-5-1-.06(5)(b)	3	1200-5-1-.11
2. Alpha emitters	2	1200-5-1-.06(5)(a)	3	1200-5-1-.11
3. Combined radium (226 & 228)	2	1200-5-1-.06(5)(a)2.	3	1200-5-1-.11
4. Uranium	[9]2	1200-5-1-.06(5)(c)	[10-]3	1200-5-1-.11
G. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfectant Residuals. Where Disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water including trihalomethanes (THMs) and haloacetic acids (HAAs).[13]				
1. Total trihalomethanes (TTHMs)	2	[14]1200-5-1-.06(6)(b)	3	1200-5-1-36,.37, and 38
2. Haloacetic Acids (HAA5)	2	1200-5-1-.06(6)(b)	3	1200-5-1-.36,.37 and .38
3. Bromate	2	1200-5-1-.06(6)(a)	3	1200-5-1-.36
4. Chlorite	2	1200-5-1-.06(6)(a)	3	1200-5-1-.36
5. Chlorine (MRDL)	2	1200-5-1-.06(6)(c)	3	1200-5-1-.36
6. Chloramine (MRDL)	2	1200-5-1-.06(6)(c)	3	1200-5-1-.36

APPENDIX A TO 1200-5-1-.19---NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE[1]

Contaminant	MCL/MRDL/TT violations[2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
7. Chlorine dioxide (MRDL), where any 2 consecutive daily samples at entrance to distribution system only are above MRDL	2	1200-5-1-.36(7)(c)2.(ii)	2[15], 3	1200-5-1-.36
8. Chlorine dioxide (MRDL), where sample(s) in distribution system the next day are also above MRDL	[16]1	1200-5-1-.36(7)(c)2.(i)	1	1200-5-1-.36
9. Control of DBP precursors—TOC (TT)	2	1200-5-1-.36-(7)(d)	3	1200-5-1-.36
10. Bench marking and disinfection profiling	N/A	N/A	3	1200-5-1-.36
11. Development of monitoring plan	N/A	N/A	3	1200-5-1-.36
H. Other Treatment Techniques				
1. Acrylamide (TT)	2	1200-5-1-.17(31)	N/A	N/A
2. Epichlorohydrin (TT)	2	1200-5-1-.17(31)	N/A	N/A
II. Unregulated Contaminant Monitoring: [17]				
A. Unregulated contaminants	N/A	N/A	3	
B. Nickel	2	1200-5-1-.06(b)	3	1200-5-1-.09
III. Public Notification for Variances and Exemptions:				
A. Operation under a variance or exemption	3	[18]1200-5-1-.19(2)(b)	N/A	N/A
B. Violation of conditions of a variance or exemption[19]	2	1200-5-1-.19(2)(b)	N/A	N/A
IV. Other Situations Requiring Public Notification:				
A. Fluoride secondary maximum contaminant Level (SMCL) exceedance	3	1200-5-1-.19(q)	N/A	N/A
B. Exceedance of nitrate MCL for non-community systems, as allowed by department	1	1200-5-1-.19(1)(a)3.	N/A	N/A
C. Availability of unregulated contaminant monitoring data	3	1200-5-1-.19(10)	N/A	N/A
D. Waterborne disease outbreak	1	1200-5-1-.31(2)(c)2.	N/A	N/A
E. Other waterborne emergency [20]	1	N/A	N/A	N/A
F. Other situations as determined by the department	[21]1, 2, 3	N/A	N/A	N/A

Appendix A –Endnotes

1. Violations and other situations not listed in this table (e.g., failure to prepare Consumer Confidence Reports), do not require notice, unless otherwise determined by the department. The department may, at its option, also require a more stringent public notice tier (e.g., Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Appendix, as authorized under 1200-5-1-.19(2)(a) and (3)(a).
2. MCL – Maximum contaminant level, MRDL – Maximum residual disinfectant level, TT-Treatment technique.
3. The term Violations of National Primary Drinking Water Regulations (NPDWR) is used here to include violations of MCL, MRDL, treatment technique, monitoring, and testing procedure requirements.
4. Failure to test for fecal coliform or E.coli is a Tier 1 violation if testing is not done after any repeat sample tests positive for coliform. All other total coliform monitoring and testing procedure violations are Tier 3.
5. Systems that violate the turbidity MCL of 2 NTU based on an average of measurements over two consecutive days must consult with the department within 24 hours after learning of the violation. Based on this consultation, the department may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the department in the 24-hour period, the violation is automatically elevated to Tier 1.
6. Systems with treatment technique violations involving a single exceedance of a maximum turbidity limit under the Surface Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule, or the Long Term 1 Enhanced Surface Water Treatment Rule (1200-5-1-.31) are required to consult with the Department within 24 hours after learning of the violation. Based on this consultation, the department may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the department in the 24-hour period, the violation is automatically elevated to Tier 1.
7. Most of the requirements of the Interim Enhanced Surface Water Treatment Rule 1200-5-1-.31 become effective January 1, 2002 for Subpart H systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 persons. The Surface Water Treatment Rule remains in effect for systems serving at least 10,000 persons even after 2002; the Interim Enhanced Surface Water Treatment Rule adds additional requirements and does not in many cases supercede the SWTR.
8. The arsenic MCL citations are effective January 23, 2006, or the effective date of this rule whichever comes first.
9. The uranium MCL tier 2 violation citations are effective December 8, 2003 for all community water systems.
10. The uranium tier 3 violations are effective December 8, 2003, for all community water systems
11. The arsenic Tier 3 MCL violations are effective January 23, 2006 or the effective date of this rule whichever comes first.

12. Failure to take a confirmation sample within 24 hours for nitrate or nitrite after an initial sample exceeds the MCL is a Tier 1 violation. Other monitoring violations for nitrate are Tier 3.
13. Subpart H community and non-transient non-community systems serving ≥10,000 must comply with new DBP MCLs, disinfectant MRDLs, and related monitoring requirements beginning January 1, 2002. All other community and non-transient non-community systems must meet the MCLs and MRDLs beginning January 1, 2004. Subpart H transient non-community systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. Subpart H transient non-community systems serving fewer than 10,000 persons and using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.
14. 1200-5-1-.06(6), 1200-5-1-36(5(a)-(b) apply until 1200-5-1-.38(1)-(11) take effect under the schedule in 1200-5-1-.38(1)(c)
15. Failure to monitor for chlorine dioxide at the entrance to the distribution system the day after exceeding the MRDL at the entrance to the distribution system is a Tier 2 violation.
16. If any daily sample taken at the entrance to the distribution system exceeds the MRDL for chlorine dioxide and one or more samples taken in the distribution system the next day exceed the MRDL, Tier 1 notification is required. Failure to take the required samples in the distribution system after the MRDL is exceeded at the entry point also triggers Tier 1 notification.
17. Some water systems must monitor for certain unregulated contaminants.
18. This citation refers to §§1415 and 1416 of the Safe Drinking Water Act. §§1415 and 1416 require that "a schedule prescribed… for a public water system granted a variance [or exemption] shall require compliance by the system…"
19. In addition to §§1415 and 1416 of the Safe Drinking Water Act, 40 CFR 142.307 specifies the items and schedule milestones that must be included in a variance for small systems.
20. Other waterborne emergencies require a Tier 1 public notice under 1200-5-1-.19(2)(a) for situations that do not meet the definition of a waterborne disease outbreak given in 1200-5-1-.04 but that still have the potential to have serious adverse effects on health as a result of short-term exposure. These could include outbreaks not related to treatment deficiencies, as well as situations that have the potential to cause outbreaks, such as failures or significant interruption in water treatment processes, natural disasters that disrupt the water supply or distribution system, chemical spills, or unexpected loading of possible pathogens onto the source water.
21. The department may place other situations in any tier it believes appropriate, based on threat to public health.
22. Failure to collect three or more samples for cryptosporidium analysis is a Tier 2 violation requiring special notice as specified in 1200-5-1-.19(11). All other monitoring and testing procedure violations are Tier 3.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Appendix B of Rule 1200-5-1-.19 Notification of Customers is amended by deleting the existing language in its entirety and substituting the following language so that as amended it shall read:

APPENDIX B TO 1200-5-1-.19. –STANDARD HEALTH EFFECTS FOR PUBLIC NOTIFICATION

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NRDWR):			
A. Microbiological Contaminants			
1a. Total coliform	Zero	See foot note[3]	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.
1b. Fecal coliform/E.coli	Zero	Zero	Fecal coliforms and E.coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
2a. Turbidity (MCL)[4]	None	1 NTU [5]/2 NTU	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
2b. Turbidity (SWTR TT)[6] (surface water and ground water under the direct influence)	None	TT[7]	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
2c. Turbidity (IESWTR and LT1ESWTR TT)[8] (surface water and ground water under the direct influence of surface water)	None	TT	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
B. Surface Water Treatment Rule (SWTR) Long Term 1 (LT1ESWTR) and Interim Enhanced Surface Water Treatment Rule (IESWTR) violations:			
3. Giardia lamblia (SWTR/ IESWTR/LT1ESWTR)	Zero	TT[10]	Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
4. Viruses (SWTR/IESWTR/ LT1ESWTR).			Same as B.3.
5. Heterotrophic plate count (HPC) bacteria[9] (SWTR/(IESWTR/LT1ESWTR).			Same as B.3.
6. Legionella (SWTR/IESWTR/LT1ESWTR).			Same as B.3.
7. Cryptosporidium (IESWTR/LT1ESWTR)			Same as B.3.
C. Inorganic Chemicals			
8. Antimony	0.006	0.006	Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
9. Arsenic[11]	0	0.01	Some people who drink water containing arsenic in excess of the MCL over many years could experiences skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.
10. Asbestos (10 µm)	7 MFL[12]	7 MFL	Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.

APPENDIX B TO 1200-5-1-.19. –STANDARD HEALTH EFFECTS FOR PUBLIC NOTIFICATION

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
11. Barium	2	2	Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
12. Beryllium	0.004	0.004	Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.
13. Cadmium	0.005	0.005	Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.
14. Chromium (total)	0.1	0.1	Some people who drink water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.
15. Cyanide	0.2	0.2	Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.
16. Fluoride	4.0	4.0	Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Fluoride in drinking water at half the MCL or more may cause mottling of children's teeth, usually in children less than nine years old. Mottling, also known as dental fluorosis, may include brown staining and/or pitting of the teeth, and occurs only in developing teeth before they erupt from the gums.
17. Mercury (inorganic)	0.002	0.002	Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.
18. Nitrate	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby symptoms.
19. Nitrite	1	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby symptoms.
20. Total Nitrate and Nitrite	10	10	Infants below the age of six months who drink water containing nitrate and nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby symptoms.
21. Selenium	0.05	0.05	Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.
22. Thallium	0.0005	0.002	Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.
D. Lead and Copper Rule:			
23. Lead	Zero	TT[13]	Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.

APPENDIX B TO 1200-5-1-.19. –STANDARD HEALTH EFFECTS FOR PUBLIC NOTIFICATION

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
24. Copper	1.3	TT[14]	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their personal doctor.
E. Synthetic Organic Compounds			
25. 2,4-D	0.07	0.07	Some people who drink water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver or adrenal glands.
26. 2,4,5-TP (Silvex)	0.05	0.05	Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.
27. Alachlor	Zero	0.002	Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.
28. Atrazine	0.003	0.003	Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.
29. Benzo(a)pyrene (PAHs)	Zero	0.0002	Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
30. Carbofuran	0.04	0.04	Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.
31. Chlordane	Zero	0.002	Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.
32. Dalapon	0.2	0.2	Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.
33. Di (2-ethylexyl) adipate	0.4	0.4	Some people who drink water containing di (2-ethyhexyl) adipate well in excess of the MCL over many years could experience general toxic effects or reproductive difficulties.
34. Di (2-ethylhexyl) phthalate	Zero	0.006	Some people who drink water containing di (2-ethylhexyl) phthalate in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.
35. Dibromochloropropane (DBCP)	Zero	0.0002	Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
36. Dinoseb	0.007	0.007	Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
37. Dioxin (2,3,7,8-TCDD)	Zero	$3x10^{-8}$	Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.

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Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
38. Diquat	0.02	0.02	Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.
39. Endothall	0.1	0.1	Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.
40. Endrin	0.002	0.002	Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.
41. Ethylene dibromide	Zero	0.00005	Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.
42. Glyphosate	0.7	0.7	Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.
43. Heptachlor	Zero	0.0004	Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.
44. Heptachlor epoxide	Zero	0.0002	Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.
45. Hexachlorobenzene	Zero	0.001	Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.
46. Hexachlorocyclopentadiene	0.05	0.05	Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.
47. Lindane	0.0002	0.0002	Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.
48. Methoxychlor	0.04	0.04	Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
49. Oxamyl (Vydate)	0.2	0.2	Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.
50. Pentachlorophenol	Zero	0.001	Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.
51. Picloram	0.5	0.5	Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.
52. Polychlorinated biphenyls (PCBs)	Zero	0.0005	Some people who drink water containing PCBs in excess of MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.
53. Simazine	0.004	0.004	Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.

APPENDIX B TO 1200-5-1-.19. –STANDARD HEALTH EFFECTS FOR PUBLIC NOTIFICATION

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
54. Toxaphene	Zero	0.003	Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.
F. Volatile Organic Compounds VOC)			
55. Benzene	Zero	0.005	Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.
56. Carbon tetrachloride	Zero	0.005	Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
57. Chlorobenzene (monochloro-benzene)	0.1	0.1	Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.
58. o-Dichlorobenzene	0.6	0.6	Some people who drink water containing o-dichlorobenzene in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.
59. p-Dichlorobenzene	0.075	0.075	Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.
60. 1,2-Dichloroethane	Zero	0.005	Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
61. 1,1-Dichloroethylene	0.007	0.007	Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
62. cis-1,2-Dichloroethylene	0.07	0.07	Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
63. trans-1,2-Dichloroethylene	0.1	0.1	Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.
64. Dichloromethane	Zero	0.005	Some people who drink water containing dichloromethane in excess of the MCl over many years could have liver problems and may have an increased risk of getting cancer.
65. 1,2-Dichloropropane	Zero	0.005	Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
66. Ethylbenzene	0.7	0.7	Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
67. Styrene	0.1	0.1	Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.
68. Tetrachloroethylene	Zero	0.005	Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their livers, and may have an increased risk of getting cancer.
69. Toluene	1	1	Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.

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Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
70. 1,2,4-Trichlorobenzene	0.07	0.07	Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.
71. 1,1,1-Trichloroethane	0.2	0.2	Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory problems.
72. 1,1,2-Trichloroethylene	0.003	0.005	Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.
73. Trichloroethylene	Zero	0.005	Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
74. Vinyl chloride	Zero	0.002	Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
75. Xylenes (total)	10	10	Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.
G. Radioactive Contaminants			
76. Beta/photon emitters	Zero	4 mrem/yr[15]	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
77. Alpha emitters	Zero	15 pCi/L[17]	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
78. Combined radium (226 & 228).	Zero	5 pCi/L	Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
79. Uranium[16]	Zero	30ug/L	Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.
H. Disinfection Byproducts (DBPs), Byproducts Precursors, and Disinfectant Residuals: Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection by-products (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs):[18]			
80. Total trihalomethanes (TTHMs)	N/A	080[19] [20]	Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.
81. Haloacetic Acids (HAA)	N/A	0.060[21]	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.

APPENDIX B TO 1200-5-1-.19. –STANDARD HEALTH EFFECTS FOR PUBLIC NOTIFICATION			
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
82. Bromate	Zero	0.010	Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.
83. Chlorite	0.08	1.0	Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia.
84. Chlorine	4 (MRDLG)[22]	4.0 (MRDL)[23]	Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.
85. Chloramines	4 (MRDLG)	4.0 (MRDL)	Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.
86a. Chlorine dioxide, where any 2 consecutive daily samples taken at the entrance to the distribution system are above the MRDL.	0.8 (MRDLG)	0.8 (MRDL)	Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. Add for public notification only: The chlorine dioxide violations reported today are the result of exceedances at the treatment facility only, not within the distribution system which delivers water to consumers. Continued compliance with chlorine dioxide levels within the distribution system minimizes the potential risk of these violations to consumers.
86b. Chlorine dioxide, where one or more distribution system samples are above the MRDL.	0.8 (MRDLG)	0.8 (MRDL)	Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. Add for public notification only: The chlorine dioxide violations reported today include exceedances of the EPA standard within the distribution system which delivers water to consumers. Violations of the chlorine dioxide standard within the distribution system may harm human health based on short-term exposures. Certain groups, including fetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure.
87. Control of DBP precursors (TOC)	None	TT	Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer.
I. Other Treatment Techniques:			

APPENDIX B TO 1200-5-1-.19. –STANDARD HEALTH EFFECTS FOR PUBLIC NOTIFICATION

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
88. Acrylamide	Zero	TT	Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.
89. Epichlorohydrin	Zero	TT	Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.

Appendix B-Endnotes

1. MCLG – Maximum contaminant level goal.
2. MCL – Maximum contaminant level.
3. For water systems analyzing at least 40 samples per month, no more than 5.0 percent of the monthly samples may be positive for total coliforms. For systems analyzing fewer than 40 samples per month, no more than one sample per month may be positive for total coliforms.
4. There are various regulations that set turbidity standards for different types of systems, including 1200-5-1-.08 and 1200-5-1-.31. The MCL for the monthly turbidity average is 1 NTU; the MCL for the 2-day average is 2 NTU for systems that are required to filter but have not yet installed filtration.
5. NTU – Nephelometric turbidity unit.
6. There are various regulations that set turbidity standards for different types of systems, including 1200-5-1-.08 and 1200-5-1-.31. Systems subject to the Surface Water Treatment Rule (both filtered and unfiltered) may not exceed 5 NTU. In addition, in filtered systems, 95 percent of samples each month must not exceed 0.5 NTU in systems using conventional or direct filtration and must not exceed 1 NTU in systems using slow sand or diatomaceous earth filtration or other filtration technologies approved by the department.
7. TT – Treatment technique.
8. There are various regulations that set turbidity standards for different types of systems, including 1200-5-1-.08 and 1200-5-1-.31. For systems subject to the IESWTR (systems serving at least 10,000 people, using surface water or ground water under the direct influence of surface water), that use conventional filtration or direct filtration, after January 1, 2002, the turbidity level of a system's combined filter effluent may not exceed 0.3 NTU in at least 95 percent of monthly measurements, and the turbidity level of a system's combined filter effluent must not exceed 1 NTU at any time. For systems subject to the LT1EWSTR (systems serving fewer than 10,000 people, using surface water or ground water under the direct influence of surface water), that use conventional filtration or direct filtration, after January 14, 2005, the turbidity level of a system's combined filter effluent may not exceed 0.3 NTU in at least 95 percent of monthly measurements, and the turbidity level of a system's combined filter effluent must not exceed 1 NTU at any time. Systems subject to the IESWTR/LT1ESWTR using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration must meet turbidity limits set by the division.
9. The bacteria detected by heterotrophic plate count (HPC) are not necessarily harmful. HPC is simply an alternative method of determining disinfectant residual levels. The number of such bacteria is an indicator of whether there is enough disinfectant in the distribution system.
10. SWTR and IESWTR/LT1ESWTR treatment technique violations that involve turbidity exceedances may use the health effects language for turbidity instead.
11. These arsenic values are effective January 23, 2006. Until then the MCL is 0.05 mg/L and there is no MCLG.
12. Millions fibers per liter.
13. Action Level = 0.015 mg/L.
14. Action Level = 1.3 mg/L.
15. Millirems per years.
16. The uranium MCL is effective December 8, 2003, for all community water systems.
17. Picocuries per liter.
18. Surface water systems and ground water systems under the direct influence of surface water are regulated under 1200-5-1-.31. Subpart H community and non-transient non-community systems serving ≥10,000 must comply with DBP MCLs and disinfectant maximum residual disinfectant levels (MRDLs) beginning January 1, 2002. Subpart H transient non-community systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. All other community and non-transient non-community water systems must meet the MCLs and MRDLs beginning January 1, 2004.
19. Community and non-transient non-community systems must comply with LRAA subpart V TTHM and HAA5 MCLs of 0.080 mg/L and 0.060 mg/L, respectively (with compliance calculated as a locational running annual average) on the schedule in 1200-5-1-.38(1).
20. The MCL for total trihalomethanes is the sum of the concentrations of the individual trihalomethanes.
21. The MCL for haloacetic acids is the sum of the concentrations of the individual haloacetic acids.
22. MRDLG – Maximum residual disinfectant level goal.
23. MRDL – Maximum residual disinfectant level.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Subparagraphs (f) and (g) of Paragraph (1) of Rule 1200-5-1-.20 Record Maintenance is amended by the deleting the existing language in its entirety and substituting the following language so that as amended subparagraphs shall read:

(f) Records of turbidity analysis shall be maintained for not less than five years. These records shall include daily worksheets, calibration data and strip charts. The strip charts shall be labeled each day the system operates with the date, time, place of collection, operator's initials, and the operating scale of the instrument.

(g) Daily worksheets, strip charts, and shift logs used in the production of monthly operation reports or operation control of the plant shall be maintained for a minimum of five years.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Paragraph (1) of Rule 1200-5-1-.20 Record Maintenance is amended by the addition of subparagraph (k) so that as amended subparagraph shall read:

(k) Copies of monitoring plans developed pursuant to Chapter 1200-5-1 shall be kept for the same period of time as the records of analyses taken under the plan are required to be kept under subparagraph (a) of this paragraph, except as specified elsewhere in this chapter.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

The first sentence only of subpart (ii) of part 4 of subparagraph (b) of paragraph (6) of Rule 1200-5-1-.31 Filtration and Disinfection is amended by deleting it and substituting the following language so that as amended it shall read:

(ii) Systems must maintain the results of individual filter monitoring taken for at least five years.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Subparagraph (d) of paragraph (1) of Rule 1200-5-1-.34 Drinking Water Source Protection is amended by the addition of Figure 1:

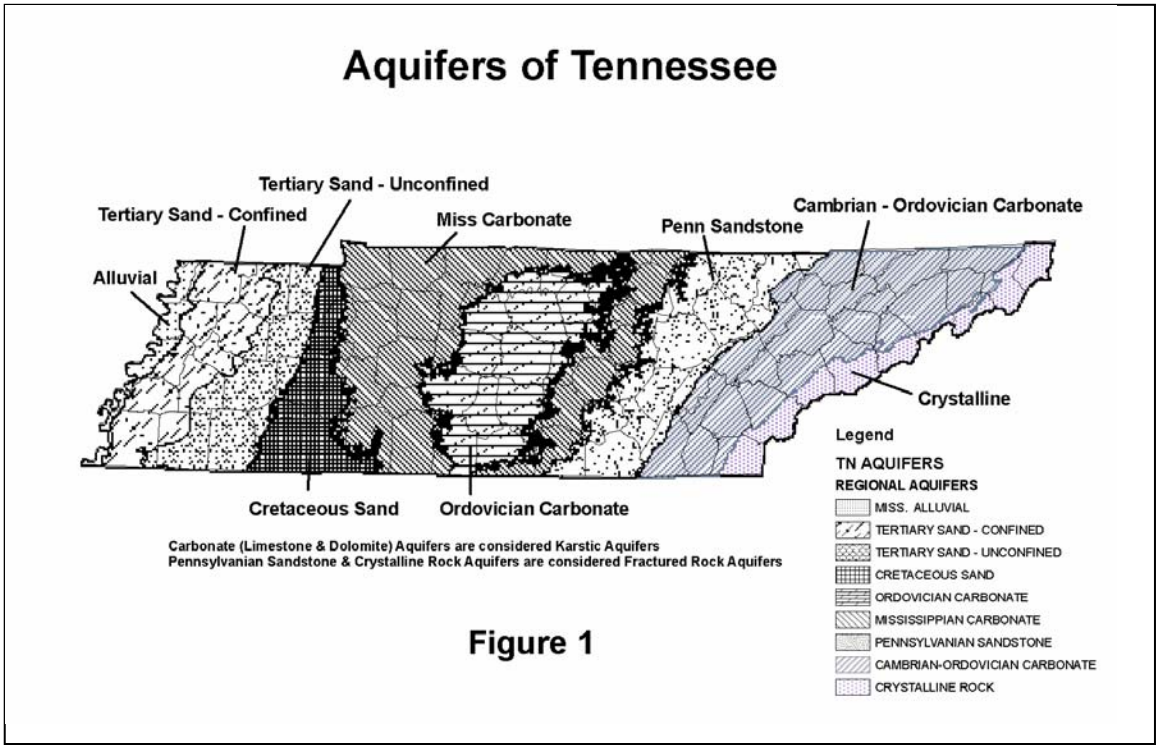

Figure 1

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Subpart (iv) of paragraph (2)(c)2. of Rule 1200-5-1-.34 Drinking Water Source Protection is amended by the deleting the existing language of Subpart (iv) in its entirety and substituting the following language so that as amended subparagraph shall read:

(iv) For Category 3 PWS east of the Tennessee River in karst and fractured rock areas (Figure 1), the collected hydrogeologic information shall be used to delineate the upgradient portion of the ground water recharge basin. Zone 2 shall describe the area (inclusive of Zone 1) that takes in the recharge basin upgradient of the wellhead/spring and shall include direct recharge points to the aquifer such as sinkholes and stormwater runoff wells.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Subparagraph (d) of paragraph (1) of Rule 1200-5-1-.35 Consumer Confidence Reports is amended by the deleting the existing language in its entirety and substituting the following language so that as amended subparagraph shall read:

(d) For the purpose of 1200-5-1-.35, detected means: at or above the levels prescribed by Table 1200-5-1-.09(1)(d) for inorganic contaminants, at or above the levels prescribed by 1200-5-1-.26 for volatile organic chemicals, by Table 1200-5-1-.10(l)(r) for other organic chemicals, at or above the DBP levels prescribed by 1200-5-1-.36(5)(b)2(iv) and at or above the levels prescribed by 1200-5-1-.11(3) for radioactive contaminants.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Subitems (II) and (III) of 1200-5-1-.35(3)(d)4(iv) Rule 1200-5-1-.35 Consumer Confidence Reports is amended by the deleting the existing language in its entirety and substituting the following language so that as amended subparagraph shall read:

(II) When compliance with the MCL is determined by calculating a running annual average of all samples taken at a monitoring location: the highest average of any of the monitoring locations and the range of all monitoring locations expressed in the same units as the MCL. For the MCLs for TTHM and HAA5 in 1200-5-1-.06(6), systems must include the highest locational running annual average for TTHM and HAA5 and the range of individual sample results for all monitoring locations expressed in the same units as the MCL. If more than one location exceeds the TTHM or HAA5 MCL, the system must include the locational running annual averages for all locations that exceed the MCL.

(III) When compliance with the MCL is determined on a system-wide basis by calculating a running annual average of all samples at all monitoring locations: the average and range of detection expressed in the same units as the MCL. The system is required to include individual sample results for the IDSE conducted under 1200-5-1-.37 when determining the range of TTHM and HAA5 results to be reported in the annual consumer confidence report for the calendar year that the IDSE samples were taken.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Paragraph (5) of Rule 1200-5-1-.36 Disinfectant Residuals, Disinfectant Byproducts, and Disinfection Byproduct Precursors is amended by deleting the existing language in its entirety and substituting the following language so that as amended the paragraph shall read:

(5) Analytical requirements.

(a) General.

1. Systems must use only the analytical methods specified in this rule, or their equivalent as approved by EPA, to demonstrate compliance with the requirements of this rule and with the requirements of 1200-5-1-.37 and 1200-5-1-.38. These methods are effective for compliance monitoring on February 16, 1999, unless a different effective date is specified in this section or by the State.

2. The following documents are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1CFR part 51. Copies may be inspected at EPA's Drinking Water Docket, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington, DC 20460, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.* EPA Method 552.1 is in Methods for the Determination of Organic Compounds in Drinking Water-Supplement II, USEPA, August 1992, EPA/600/R–92/129 (available through National Information Technical Service (NTIS), PB92–207703). EPA Methods 502.2, 524.2, 551.1, and 552.2 are in Methods for the Determination of Organic Compounds in Drinking Water-Supplement III, USEPA, August 1995, EPA/600/R–95/131 (available through NTIS, PB95–261616). EPA Method 300.0 is in Methods for the Determination of Inorganic Substances in Environmental Samples, USEPA, August 1993, EPA/600/R–93/100 (available through NTIS, PB94–121811). EPA Methods 300.1 and 321.8 are in Methods for the Determination of Organic and Inorganic Compounds in Drinking Water, Volume 1, USEPA, August 2000, EPA 815–R–00–014 (available through NTIS, PB2000– 106981). EPA Method 317.0, Revision 2.0, ''Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography with the Addition of a Postcolumn Reagent for Trace Bromate Analysis,'' USEPA, July 2001, EPA 815– B–01–001, EPA Method 326.0, Revision 1.0, ''Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography Incorporating the Addition of a Suppressor Acidified Postcolumn Reagent for Trace Bromate Analysis,'' USEPA, June 2002, EPA 815– R–03–007, EPA Method 327.0, Revision 1.1, ''Determination of Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry,'' USEPA, May 2005, EPA 815–R–05–008 and EPA Method 552.3, Revision 1.0, ''Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection,'' USEPA, July 2003, EPA–815–B–03–002 can be accessed and downloaded directly on-line at *http://www.epa.gov/safewater/methods/ sourcalt.html.* EPA Method 415.3, Revision 1.1, ''Determination of Total and Drinking Water,'' USEPA, February 2005, EPA/600/R–05/055 can be accessed and downloaded directly on-line at *www.epa.gov/nerlcwww/ ordmeth.htm.* Standard Methods 4500– Cl D, 4500–Cl E, 4500–Cl F, 4500–Cl G, 4500–Cl H, 4500–Cl I, 4500–ClO2 D, 4500–ClO2 E, 6251 B, and 5910 B shall be followed in accordance with Standard Methods for the Examination of Water and Wastewater, 19th or 20th Editions, American Public Health Association, 1995 and 1998, respectively. The cited methods published in either edition may be used. Standard Methods 5310 B, 5310 C, and 5310 D shall be followed in accordance with the Supplement to the 19th Edition of Standard Methods for the Examination of Water and Wastewater, or the Standard Methods for the Examination of Water and Wastewater, 20th Edition, American Public Health Association, 1996 and 1998, respectively. The cited methods published in either edition may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005. Standard Methods 4500–Cl D–00, 4500–Cl E–00, 4500–Cl F–00, 4500–Cl G–00, 4500–Cl H–00, 4500–Cl I–00, 4500–ClO2 E–00, 6251 B–94, 5310 B–00, 5310 C–00, 5310 D–00 and 5910 B–00 are available at *http:// www.standardmethods.org* or at EPA's Water Docket. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only Online versions that are IBR-approved. ASTM Methods D 1253–86 and D 1253–86 (Reapproved 1996) shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials International, 1996 or any ASTM edition containing the IBR-approved version of the method may be used. ASTM Method D1253–03 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials International, 2004 or any ASTM edition containing the IBR-approved version of the method may be used. ASTM Method D 6581–00 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for

Testing and Materials International, 2001 or any ASTM edition containing the IBR-approved version of the method may be used; copies may be obtained from the American Society for Testing and Materials International, 100 Barr Drive, West Harbor Conshohocken, PA 19428 – : 2959

(b) Disinfection byproducts.

1. Systems must measure disinfection byproducts by the methods (as modified by the following table:

APPROVED METHODS FOR DISINFECTION BYPRODUCT COMPLIANCE MONITORING

Contaminant and methodology [1]	EPA method	Standard method [2]	SM online [9]	ASTM method [3]
TTHM				
P&T/GC/ElCD & PID	502.2 [4]			
P&T/GC/MS	524.2			
LLE/GC/ECD	551.1			
HAA5				
LLE (diazomethane)/GC/ECD		6251 B [5]	6251 B–94	
SPE (acidic methanol)/GC/ECD	552.1 [5]			
LLE (acidic methanol)/GC/ECD	552.2, 552.3			
Bromate				
Ion chromatography	300.1			D 6581–00
Ion chromatography & post column reaction	317.0 Rev 2.0 [6], 326.0 [6]			
IC/ICP–MS	321.8[6,7]			
Chlorite				
Amperometric titration		4500–ClO_2 E[8]	4500–ClO_2 E–00 [8]	
Spectrophotometry	327.0 Rev 1.1 [8]			
Ion chromatography	300.0, 300.1, 317.0 Rev 2.0, 326.0.			D 6581–00

[1] P&T = purge and trap; GC = gas chromatography; ElCD = electrolytic conductivity detector; PID = photoionization detector; MS = mass spectrometer; LLE = liquid/liquid extraction; ECD = electron capture detector; SPE = solid phase extraction; IC = ion chromatography; ICP–MS = inductively coupled plasma/mass spectrometer.

[2] 19th and 20th editions of Standard Methods for the Examination of Water and Wastewater, 1995 and 1998, respectively, American Public Health Association; either of these editions may be used.

[3] Annual Book of ASTM Standards, 2001 or any year containing the cited version of the method, Vol 11.01.

[4] If TTHMs are the only analytes being measured in the sample, then a PID is not required.

[5] The samples must be extracted within 14 days of sample collection.

[6] Ion chromatography & post column reaction or IC/ICP-MS must be used for monitoring of bromate for purposes of demonstrating eligibility of reduced monitoring, as prescribed in 1200-5-1-.36(6)(b)3.(ii).

[7] Samples must be preserved at the time of sampling with 50 mg ethylenediamine (EDA)/L of sample and must be analyzed within 28 days.

[8] Amperometric titration or spectrophotometry may be used for routine daily monitoring of chlorite at the entrance to the distribution system, as prescribed in 1200-5-1-.36(6)(b)2.(i)(I). Ion chromatography must be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the distribution system, as prescribed in 1200-5-1-.36(6)(b)2.(i)(II) and (b)2.(ii).

[9] The Standard Methods Online version that is approved is indicated by the last two digits in the method number which is the year of approval by the Standard Method Committee. Standard Methods Online are available at *http://www.standardmethods.org.*

2. Analyses under this section for disinfection byproducts must be conducted by laboratories that have received certification by EPA or the State, except as specified under paragraph (b)(3) of this section. To receive certification to conduct analysis for the DBP contaminants in 1200-5-1-.06, 1200-5-1-.36, 37 and 38 the laboratory must:

(i) Analyze Performance Evaluation (PE) samples that are acceptable to EPA or the State at least once during each consecutive 12-month period by each method for which the laboratory desires certification.

(ii) Until March 31, 2007, in these analyses of PE samples, the laboratory must achieve quantitative results within the acceptance limit on a minimum, of 80% of the analytes included in each PE sample. The acceptance limit is defined as the 95% confidence interval calculated around the mean of the PE study between a maximum and minimum acceptance limit of +/-50% and +/-15% of the study mean.

(iii) Beginning April 1, 2007, the laboratory must achieve quantitative results on the PE sample analyses that are within the following acceptance limits:

DBP	Acceptance limits (percent of true value)	Comments
TTHM		
Chloroform	±20	Laboratory must meet all 4 individual THM acceptance limits in order to successfully pass a PE sample for TTHM
Bromodichloromethane	±20	
Dibromochloromethane	±20	
Bromoform	±20	
HAA5		
Monochloroacetic Acid	±40	Laboratory must meet the acceptance limits for all 5 of the HAA5 compounds in order to successfully pass a PE sample for HAA5
Dichloroacetic Acid	±40	
Trichloroacetic Acid	±40	
Monobromoacetic Acid	±40	
Dibromoacetic Acid	±40	
Chlorite	±30	
Bromate	±30	

(iv) Beginning April 1, 2007, report quantitative data for concentrations at least as low as the ones listed in the following table for all DBP samples analyzed for compliance with 1200-5-1-.06, .36, .37, and .38:

DBP	Minimum reporting level (mg/L)[1]	Comments
TTHM[2]		
Chloroform	0.0010	
Bromodichloromethane	0.0010	
Dibromochloromethane	0.0010	
Bromoform	0.0010	
HAA5[2]		
Monochloroacetic Acid	0.0020	
Dichloroacetic Acid	0.0010	
Trichloroacetic Acid	0.0010	
Monobromoacetic Acid	0.0010	
Dibromoacetic Acid	0.0010	
Chlorite	0.020	Applicable to monitoring as prescribed in 1200-5-1-.36(6)(b)2(i)(II) and (b)2(ii).
Bromate	0.0050 or 0.00010	Laboratories that use EPA Methods 317.0 Revision 2.0, 326.0 or 321.8 must meet a 0.0010 mg/L MRL for bromate.

[1] The calibration curve must encompass the regulatory minimum reporting level (MRL) concentration. Data may be reported for concentrations lower than the regulatory MRL as long as the precision and accuracy criteria are met by analyzing an MRL check standard at the lowest reporting limit chosen by the laboratory. The laboratory must verify the accuracy of the calibration curve at the MRL concentration by analyzing an MRL check standard with a concentration less than or equal to 110% of the MRL with each batch of samples. The measured concentration for the MRL check standard must be ±50% of the expected value, if any field sample in the batch has a concentration less than 5 times the regulatory MRL. Method requirements to analyze higher concentration check standards and meet tighter acceptance criteria for them must be met in addition to the MRL check standard requirement.

[2] When adding the individual trihalomethane or haloacetic acid concentrations to calculate the TTHM or HAA5 concentrations, respectively, a zero is used for any analytical result that is less than the MRL concentration for that DBP, unless otherwise specified by the State.

(c) Disinfectant residuals.

1. Systems must measure residual disinfectant concentrations for free chlorine, combined chlorine (chloramines), and chlorine dioxide by the methods listed in the following table:

Methodology	SM (19th or 20th ed)	SM Online[2]	ASTM method	EPA method	Residual measured[1]			
					Free Cl_2	Combined Cl_2	Total Cl_2	ClO_2
Amperometric Titration	4500-C D	4500-C-D-00	D 1253-86 (96), 03		X	X	X	
Low Level Amperometric Titration	4500-C E	4500-C-E-00					X	
DPD Ferrous Titrimetric	4500-C F	4500-C-F-00			X	X	X	
DPD Colorimetric	4500-C G	4500-C-G-00			X	X	X	
Syringaldazine (FACTS)	4500-C H	4500-C-H-00			X			
Iodometric Electrode	4500-C I	4500-C-I-00					X	
DPD	4500-C O_2 D							X
Amperometric Method II	4500-C O_2 E	4500 C O_2 E-00						X
Lissamine Green Spectrophotometric				327.0 Rev 1.1				X

[1] X indicates method is approved for measuring specified disinfectant residual. Free chlorine or total chlorine may be measured for demonstrating compliance with the chlorine MRDL and combined chlorine, or total chlorine may be measured for demonstrating compliance with the chloramine MRDL.

[2] The Standard Methods Online version that is approved is indicated by the last two digits in the method number which is the year of approval by the Standard Method Committee. Standard Methods Online are available at http://www.standardmethods.org.

2. If approved by the state, systems may also measure residual disinfectant concentrations for chlorine, chloramines, and chlorine dioxide by using DPD colorimetric test kits.

3. An operator approved by the EPA or the state must measure residual disinfectant.

(d) Additional analytical methods. Systems required to analyze parameters not included in subparagraphs (b) and (c) must use the following methods. A party approved by the EPA or the state must measure these parameters.

1. Alkalinity. All methods allowed in 1200-5-1-.33(10)(a)4 for measuring alkalinity.

2. Bromide. EPA Methods 300.0, 300.1, 317.0 Revision 2.0, 326.0, or ASTM D 6581–00.

3. Total Organic Carbon (TOC). Standard Method 5310 B or 5310 B–00 (High-Temperature Combustion Standard Method) or Standard Method 5310 C or 5310 C–00 (Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method) or Standard Method 5310 D or 5310 D–00 (Wet-Oxidation Method) or EPA Method 415.3 Revision 1.1. Inorganic carbon must be removed from the samples prior to analysis. TOC samples may not be filtered prior to analysis. TOC samples must be acidified at the time of sample collection to achieve pH less than or equal to 2 with minimal addition of the acid specified in the method or by the instrument manufacturer. Acidified TOC samples must be analyzed within 28 days.

4. Specific Ultraviolet Absorbance (SUVA). SUVA is equal to the UV absorption at 254 nm (UV254) (measured in m^{-1} divided by the dissolved organic carbon (DOC) concentration) (measured as mg/L). In order to determine SUVA, it is necessary to separately measure UV254 and DOC. When determining SUVA, systems must use the methods stipulated in subparagraph (d)4(i) to measure DOC and the method stipulated in subparagraph (d)4(ii) to measure UV254. SUVA must be determined on water prior to the addition of disinfectants/oxidants by the system. DOC and UV254 samples used to determine a SUVA value must be taken at the same time and at the same location.

(i) Dissolved Organic Carbon (DOC). Standard Method 5310 B or 5310 B–00 (High-Temperature Combustion Method) or Standard Method 5310 C or 5310 C–00 (Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method) or Standard Method 5310 D or 5310 D–00 (Wet-Oxidation Method) or EPA Method 415.3 Revision 1.1. DOC samples must be filtered through the 0.45 µm pore-diameter filter as soon as practical after sampling, not to exceed 48 hours. After filtration, DOC samples must be acidified to achieve pH less than or equal to 2 with minimal addition of the acid specified in the method or by the instrument manufacturer. Acidified DOC samples must be analyzed within 28 days of sample collection. Inorganic carbon must be removed from the samples prior to analysis. Water passed through the filter prior to filtration of the sample must serve as the filtered blank. This filtered blank must be analyzed using procedures identical to those used for analysis of the samples and must meet the following criteria: DOC < 0.5 mg/L.

(ii) Ultraviolet Absorption at 254 nm (UV254). Standard Method 5910 B or 5910 B–00 (Ultraviolet Absorption Method) or EPA Method 415.3 Revision 1.1. UV absorption must be measured at 253.7 nm (may be rounded off to 254 nm). Prior to analysis, UV254 samples must be filtered through a 0.45 µm pore-diameter filter.

The pH of UV254 samples may not be adjusted. Samples must be analyzed as soon as practical after sampling, not to exceed 48 hours.

5. pH. All methods allowed in Table 1200-5-1-.33(10)(a)4 for measuring pH.

6. Magnesium. All methods in the following table are allowed for measuring magnesium.

Contaminant and methodology	EPA	ASTM	SM 18th and 19th ed.	SM 20th ed.
Magnesium				
Atomic Absorption		D511-93B	311B	
ICP	200.7		3120B	3120B
Complexation Titrimetric Methods		D511-93A	3500-Mg-E	3500-Mg-B

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendents

Subparagraph (b) of Rule 1200-5-1-.36(6) Disinfectant Residuals, Disinfectant Byproducts, and Disinfection Byproduct Precursors is amended by deleting the existing language in its entirety and substituting the following language so that as amended the paragraph shall read:

(b) Monitoring requirements for disinfection byproducts.

1. TTHMs and HAA5.

(i) Routine monitoring. Systems must monitor at the frequency indicated in the following table:

Routine Monitoring Frequency for TTHM and HAA5

Type of System	Minimum Monitoring Frequency	Sample location in the distribution system
Subpart H system serving at least 10,000 persons	Four water samples per quarter per treatment plant	At least 25 percent of all samples collected each quarter at locations representing maximum residence time. Remaining samples taken at locations representative of at least average residence time in the distribution system and representing the entire distribution system, taking into account number of persons served, different sources of water and different treatment methods.[1]
Subpart H systems serving 500 to 9,999 persons.	One water sample per quarter per treatment plant	Locations representing the maximum residence time.[1]
Subpart H systems serving fewer than 500 persons.	One sample per year per treatment plant during month of warmest water temperature	Locations representing maximum residence time.[1] If the sample (or average of annual samples, if more than one sample is taken) exceeds MCL, the system must increase monitoring to one sample per quarter, taken at a point reflecting the maximum residence time in the distribution system, until system meets reduced monitoring criteria in subpart (b)1(iv) for reduced monitoring..
System using only ground water not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons	One water sample per quarter per treatment plant.[2]	Locations representing maximum residence time.[1]
Systems using only ground water not under the direct influence of surface water using a chemical disinfectant and serving fewer than 10,000 persons	One sample per year per treatment plant[2] during month of the warmest water temperature.	Locations representing maximum residence time.[1] If the sample (or average of annual samples, if more than one sample is taken) exceeds the MCL, the system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until system meets criteria for reduced monitoring described in subpart (b)1(iv) for reduced monitoring.

[1]If a system elects to sample more frequently than the minimum required, at least 25 percent of all samples collected each quarter (including those taken in excess of the required frequency) must be taken at locations that represent the maximum residence time of the water in the distribution system. The remaining samples must be taken at locations representative of at least average residence time in the distribution system.

[2]Multiple wells drawing water from a single aquifer may be considered one treatment plant for determining the minimum number of samples required, with State approval in accordance with criteria approved by the state.

(ii) Systems may reduce monitoring, except as otherwise provided, in accordance with the following table:

Reduced Monitoring Frequency for TTHM and HAA5

If you are a ...	You may reduce monitoring if you have monitored at least one year and your ...	To this level
Subpart H systems serving at least 10,000 persons which has a source water annual average TOC level before any treatment, ≤ 4.0mg/L.	TTHM annual average ≤0.040 mg/L and HAA5 annual average ≤0.030 mg/L.	One sample per treatment plant per quarter at distribution system location reflecting maximum residence time.
Subpart H system serving from 500 to 9,999 persons which has a source water annual average TOC level before any treatment. ≤ 4.0 mg/L.	TTHM annual average ≤ 0.040 mg/L and HAA5 annual average ≤ 0.030 mg/L.	One sample per treatment plant per year at distribution system location reflecting maximum residence time during month of warmest water temperature.
Subpart H system serving fewer than 500 persons		Subpart H systems serving fewer than 500 persons may not reduce its monitoring to less than one sample per treatment plant per year.
System using only ground water not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons.	TTHM annual average ≤ 0.040 mg/L and HAA5 annual average ≤ 0.030 mg/L	One sample per treatment plant per year at distribution system location reflecting maximum residence time during month of warmest water temperature.
System using only ground water not under direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons	TTHM annual average ≤ 0.040 mg/L and HAA5 annual average ≤ 0.030 mg/L for two consecutive years OR TTHM annual average of ≤0.020 mg/L and HAA5 annual average ≤0.015 mg/L for one year.	One sample per treatment plant per three year monitoring cycle at distribution system location reflecting maximum residence time during month of warmest water temperature, with the three-year cycle beginning on January 1 following quarter in which system qualifies for reduced monitoring.

(iii) Monitoring requirements for source water TOC. In order to qualify for reduced monitoring for TTHM and HAA5 under paragraph (b)1(ii), subpart H systems not monitoring under the provisions of subparagraph (d) must take monthly TOC samples every 30 days at a location prior to any treatment, beginning April 1, 2008 or earlier, if specified by the State. In addition to meeting other criteria for reduced monitoring in paragraph (b)1(ii), the source water TOC running annual average must be less than or equal to 4.0 mg/L (based on the most recent four quarters of monitoring) on a continuing basis at each treatment plant to reduce or remain on reduced monitoring for TTHM and HAA5. Once qualified for reduced monitoring for TTHM and HAA5 under part (b)1(ii), a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to any treatment.

(iv) Systems on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year (for systems which must monitor quarterly) or the result of the sample (for systems which must monitor no more frequently than annually) is no more than 0.060 mg/L and 0.045 mg/L for TTHMs

and HAA5, respectively. Systems that do not meet these levels must resume monitoring at the frequency identified in paragraph (b)(1)(i) of this section (minimum monitoring frequency column) in the quarter immediately following the monitoring period in which the system exceeds 0.060 mg/L or 0.045 mg/L for TTHMs and HAA5, respectively. For systems using only ground water not under the direct influence of surface water and serving fewer than 10,000 persons, if either the TTHM annual average is >0.080 mg/L or the HAA5 annual average is >0.060 mg/L, the system must go to the increased monitoring identified in paragraph (b)(1)(i) of this section (sample location column) in the quarter immediately following the monitoring period in which the system exceeds 0.080 mg/L or 0.060 mg/L for TTHMs or HAA5 respectively.

(v) Systems on increased monitoring may return to routine monitoring if TTHM annual average is equal to or less than 0.040 mg/L and HAA5 is less than or equal to 0.030 mg/L.

(vi) The State may return a system to routine monitoring at the State's discretion.

2. Chlorite. Community and nontransient noncommunity water systems using chlorine dioxide, for disinfection or oxidation, must conduct monitoring for chlorite.

(i) Routine Monitoring

(I) Daily monitoring. Systems must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the system must take additional samples in the distribution system the following day at the locations required by subparagraph (b)2(ii) of this section, in addition to the sample required at the entrance to the distribution system.

(II) Monthly monitoring. Systems must take a three-sample set each month in the distribution system. The system must take one sample at each of the following locations: near the first customer, at a location representative of average residence time, and at a location reflecting maximum residence time in the distribution system. Any additional routine sampling must be conducted in the same manner (as three-sample sets, at the specified locations). The system may use the results of additional monitoring conducted under subparagraph (b)2(ii) of this section to meet the requirement for monitoring in this paragraph.

(ii) Additional monitoring. On each day following a routine sample monitoring result that exceeds the chlorite MCL at the entrance to the distribution system, the system is required to take three chlorite distribution system samples at the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

(iii) Reduced monitoring.

(I) Chlorite monitoring at the entrance to the distribution system required by paragraph (b)2(i)(I) of this section may not be reduced.

(II) Chlorite monitoring in the distribution system required by paragraph (b)2.(i)(II) of this section may be reduced to one three-sample set per quarter after one year of monitoring where no individual chlorite sample taken in the distribution system under paragraph (b)2(i)(II) of this section has exceeded the chlorite MCL and the system has not been required to conduct monitoring under paragraph (b)2(ii) of this section. The system may remain on the reduced monitoring

schedule until either any of the three individual chlorite samples taken quarterly in the distribution system under paragraph (b)2(i)(B) of this section exceeds the chlorite MCL or the system is required to conduct monitoring under paragraph (b)2(ii) of this section, at which time the system must revert to routine monitoring.

3. Bromate

(i) Routine monitoring. Community and nontransient noncommunity systems using ozone, for disinfection or oxidation, must take one sample per month for each treatment plant in the system using ozone. Systems must take samples monthly at the entrance to the distribution system while the ozonation system is operating under normal conditions.

(ii) Reduced monitoring.

(I) Until March 31, 2009, systems required to analyze for bromate may reduce monitoring from monthly to quarterly, if the system's average source water bromide concentration is less than 0.05 mg/L based on representative monthly bromide measurements for one year. The system may remain on reduced bromate monitoring until the running annual average source water bromide concentration, computed quarterly, is equal to or greater than 0.05 mg/L based on representative monthly measurements. If the running annual average source water bromide concentration is greater than or equal to 0.05 mg/L, the system must resume routine monitoring required by subpart (b)3(i) in the following month.

(II) Beginning April 1, 2009, systems may no longer use the provisions of item (b)3(ii)(I) to qualify for reduced monitoring. A system required to analyze for bromate may reduce monitoring from monthly to quarterly, if the system's running annual average bromate concentration is less than or equal to 0.0025 mg/L based on monthly bromate measurements under subpart (b)3(i) for the most recent four quarters, with samples analyzed using Method 317.0 Revision 2.0, 326.0 or 321.8. If a system has qualified for reduced bromate monitoring under item (b)3(ii)(I), that system may remain on reduced monitoring as long as the running annual average of quarterly bromate samples is less than or equal to 0.0025 mg/L based on samples analyzed using Method 317.0 Revision 2.0, 326.0, or 321.8. If the running annual average bromate concentration is >0.0025 mg/L, the system must resume routine monitoring required by subpart (b)(3)(i).

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Subpart (ii) of Rule 1200-5-1-.36(9)(a)3 Disinfectant Residuals, Disinfectant Byproducts, and Disinfection Byproduct Precursors is amended by deleting the existing language in its entirety and substituting the following language so that as amended the paragraph shall read:

(ii) Softening that results in removing at least 10 mg/L of magnesium hardness (as CaCO3), measured monthly according to 1200-5-1-.36(5)(d)6 and calculated quarterly as a running annual average.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202

Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Chapter 1200-5-1 is amended by the addition of Rule .37 so that as amended the Rule shall read:

1200-5-1-.37 Stage 2 Initial Distribution System Evaluation for Disinfection Byproducts

(1) General Requirements: The requirements of Rule 1200-5-1-.37 constitute national primary drinking water regulations.

(a) The requirements of this rule constitute national primary drinking water regulations. The regulations in this rule establish monitoring and other requirements for identifying compliance monitoring locations to be used for determining compliance with maximum contaminant levels for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5) in 1200-5-1-.38 Locational Running Annual Average (LRAA) through the use of an Initial Distribution System Evaluation (IDSE). IDSEs are studies, used in conjunction with, but separate from, compliance monitoring in 1200-5-1-.36, to identify and select LRAA compliance monitoring sites that represent high TTHM and HAA5 levels throughout the distribution system. The studies will be based on system-specific monitoring. As an alternative, you may use other system-specific data that provide equivalent or better information on site selection for monitoring to demonstrate compliance with the LRAAs as provided for in the 40/30 portion of this rule.

(b) Applicability. You are subject to these requirements if your system is a community water system that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light or if your system is a nontransient noncommunity water system that serves at least 10,000 people and adds a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light. You must conduct an Initial Distribution System Evaluation (IDSE), unless you meet the 40/30 certification criteria or the State has granted a very small system waiver for the IDSE or you meet the criteria defined by the State for a very small system waiver . If you have a very small system waiver for the IDSE under 1200-5-1-.37(4)(c), you are not required to submit an IDSE report. All other systems must submit an IDSE report, even if you meet the 40/30 certification criteria in 1200-5-1-.37(4)(c).

(c) Schedule.

1. You must comply with the Initial Distribution System Evaluation (IDSE) on the schedule in the following table, based on your system type.

If you serve this population	You must submit your standard monitoring plan or system specific study plan [1] or 40/30 certification [2] to the state by or receive a very small system waiver from the state by	You must complete your standard monitoring or system specific study by	You must submit your IDSE report to the state by[3]
Systems that are not part of a combined distribution system and systems that serve the largest population in the combined distribution system			
(i)100,000 or more	October 1, 2006	September 30, 2008	January 1, 2009
(ii)50,000-99,999	April 1, 2007	March 31, 2009	July 1, 2009
(iii)10,000-49,999	October 1, 2007	September 30, 2009	January 1, 2010
(iv)<10.000 (CWS only)	April 1, 2008	March 31, 2010	July 1, 2010
Other systems that are part of a combined distribution system			
(v) Wholesale system or consecutive system	At the same time as the system with the earliest compliance date in the combined distribution system.	At the same time as the system with the earliest compliance date in the combined distribution system	At the same time as the system with the earliest compliance date in the combined distribution system

[1] If, within 12 months after the date identified in this column, the State does not approve your plan or notify you that it has not yet completed its review, you may consider the plan that you submitted as approved. You must implement that plan and you must complete standard monitoring or a system specific study no later than the date identified in the third column.

[2]You must submit your 40/30 certification by the date indicated.

[3] If, within three months after the date identified in this column (nine months after the date identified in this column if you must comply on the schedule in paragraph (c)(1)(iii), the State does not approve your IDSE report or notify you that it has not yet completed its review, you may consider the report that you submitted as approved and you must implement the recommended monitoring as required.

2. For the purpose of the schedule in paragraph (c)(1) the State may determine that the combined distribution system does not include certain consecutive systems based on factors such as receiving water from a wholesale system only on an emergency basis or receiving only a small percentage and small volume of water from a wholesale system. The State may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

(d) You must conduct standard monitoring that meets the requirements in 1200-5-1-.37(2), or a system specific study that meets the requirements in 1200-5-1-.37(3), or certify to the State that you meet 40/30 certification criteria under 1200-5-1-.37(4), or qualify for a very small system waiver under 1200-5-1-.37(5).

1. You must have taken the full complement of routine TTHM and HAA5 compliance samples required of a system with your population and source water under subpart L of this part (or you must have taken the full complement of reduced TTHM and HAA5 compliance samples required of a system with your population and source water under 1200-5-1-.36 if you meet reduced monitoring criteria under 1200-5-1-.36) during the period specified in 1200-5-1-.37(4) to meet the 40/30 certification criteria in 1200-5-1-.37(4). You must have taken TTHM and HAA5 samples under 1200-5-1-.36 to be eligible for the very small system waiver in 1200-5-1-.37(5).

2. If you have not taken the required samples, you must conduct standard monitoring that meets the requirements in 1200-5-1-.37(2), or a system specific study that meets the requirements in 1200-5-1-.37(3).

(e) You must use only the analytical methods specified in 1200-5-1-.36, or otherwise approved by the state or the EPA for monitoring under the provisions of 1200-5-1-.36, 37 and 38.

(f) IDSE results will not be used for the purpose of determining compliance with MCLs in 1200-5-1-.06

(2) Standard Monitoring

(a) Standard monitoring plan. Your standard monitoring plan must comply with paragraphs (a)1 through (a)4. You must prepare and submit your standard monitoring plan to the State according to the schedule in 1200-5-1-.37(1)(c).

1. Your standard monitoring plan must include a schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating locations and dates of all projected standard monitoring, and all projected 1200-5-1-.36 compliance monitoring.

2. Your standard monitoring plan must include justification of standard monitoring location selection and a summary of data you relied on to justify standard monitoring location selection.

3. Your standard monitoring plan must specify the population served and system type (subpart H or ground water).

4 You must retain a complete copy of your standard monitoring plan submitted under this paragraph (a), including any State modification of your standard monitoring plan, for as long as you are required to retain your IDSE report under subparagraph (c)4.

(b) Standard monitoring.

1. You must monitor as indicated in the table in subparagraph (b)1. You must collect dual sample sets at each monitoring location. One sample in the dual sample set must be analyzed for TTHM. The other sample in the dual sample set must be analyzed for HAA5. You must conduct one monitoring period during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature. You must review available compliance, study, or operational data to determine the peak historical month for TTHM or HAA5 levels or warmest water temperature.

Source Water Type	Population Size Category	Monitoring periods and frequency of sampling	Distribution system monitoring locations [1]				
			Total per monitoring period	Near entry points	Average residence time	High TTHM locations	High HAA5 locations
Subpart H	<500 consecutive systems	One (during peak historical month) [2]	2	1		1	
	<500 non-consecutive systems		2			1	1
	500-3300 consecutive systems	4 (every 90 days)	2	1		1	
	500-3300 non-consecutive systems		2			1	1
	3,301-9,999		4		1	2	1
	10,000-49,999	Six (every sixty days)	8	1	2	3	2
	50,000-249,999		16	3	4	5	4
	250,000-999,999		24	4	6	8	6
	1,000,000-4,999,999		32	6	8	10	8
	>5,000,000		40	8	10	12	10
Ground Water							
	<500 consecutive systems	One (during peak historical month) [2]	2	1		1	
	<500 non-consecutive systems		2			1	1
	500-9,999	Four (every 90 days)	2			1	1
	10,000-99,999		6	1	1	2	2
	100,000-499,999		8	1	1	3	3
	>5,000,000		12	2	2	4	4

[1]A dual sample set (i.e. a TTHM and an HAA5 sample) must be taken at each monitoring location during each monitoring period.
[2]The peak historical month is the month with the highest TTHM or HAA5 levels or the warmest water temperature.

2. You must take samples at locations other than the existing monitoring locations required by 1200-5-1-.36. Monitoring locations must be distributed throughout the distribution system.

3. If the number of entry points to the distribution system is fewer than the specified number of entry point monitoring locations, excess entry point samples must be replaced equally at high TTHM and HAA5 locations. If there is an odd extra location number, you must take a sample at a high TTHM location. If the number of entry points to the distribution system is more than the specified number of entry point monitoring locations, you must take samples at entry points to the distribution system having the highest annual water flows.

4. Your monitoring under this subparagraph (b) may not be reduced under the provisions of 1200-5-1-.15 and the State may not reduce your monitoring using the provisions of 40CFR142.16(m).

(c) IDSE report. Your IDSE report must include the elements required in paragraphs (c)1 through (c)4. You must submit your IDSE report to the State according to the schedule in 1200-5-1-.37(1)(c).

1. Your IDSE report must include all TTHM and HAA5 analytical results from 1200-5-1-.36 compliance monitoring and all standard monitoring conducted during the period of the IDSE as individual analytical results and LRAAs presented in a tabular or spreadsheet format acceptable to the State. If changed from your standard monitoring plan submitted under subparagraph (a), your report must also include a schematic of your distribution system, the population served, and system type (subpart H or ground water).

2. Your IDSE report must include an explanation of any deviations from your approved standard monitoring plan.

3. You must recommend and justify Locational Running Annual Average compliance monitoring locations and timing based on the protocol in 1200-5-1-.37(6).

4. You must retain a complete copy of your IDSE report for 10 years after the date that you submitted your report. If the State modifies the LRAA monitoring requirements that you recommended in your IDSE report or if the State approves alternative monitoring locations, you must keep a copy of the State's notification on file for 10 years after the date of the State's notification. You must make the IDSE report and any State notification available for review by the State or the public.

(3) System Specific Studies

(a) System specific study plan. Your system specific study plan must be based on either existing monitoring results as required under subparagraph (a)1 or modeling as required under subparagraph (a)2 of this paragraph. You must prepare and submit your system specific study plan to the State according to the schedule in 1200-5-1-.37(1)(c).

1. Existing monitoring results. You may comply by submitting monitoring results collected before you are required to begin monitoring under 1200-5-1-.37(1)(c). The monitoring results and analysis must meet the criteria in subparagraphs (a)1(i) and (a)1(ii).

(i) Minimum requirements.

(I) TTHM and HAA5 results must be based on samples collected and analyzed in accordance with 1200-5-1-.36(5). TTHM and HAA5 results must be based on samples collected no earlier than five years prior to the study plan submission date.

(II) The monitoring location and frequency must meet the conditions identified in this paragraph (a)1(i)(II). Each location must be sampled once during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature for every 12 months of data submitted for that location. Monitoring results must include all compliance samples collected in accordance with 1200-5-1-.36 plus additional monitoring results as necessary to meet minimum sample requirements.

System Type	Population Size Category	Number of monitoring locations	Number of samples	
Subpart H	<500	3	3	3
	500-3,300	3	9	9
	3,301-9,999	6	36	36
	10,000-49,999	12	72	72
	50,000-249,999	24	144	144
	250,000-999,999	36	216	216
	1,000,000-4,999,999	48	288	288
	>5,000,000	60	360	360
Ground Water	<500	3	3	3
	500-9,999	3	9	9
	10,000-99,999	12	48	48
	100,000-499,999	18	72	72
	>500,000	24	96	96

(ii) Reporting Monitoring Results. You must report the information in subparagraph (a) l(ii).

(I) You must report previously collected monitoring results and certify that the reported monitoring results include all compliance and non-compliance results generated during the time period beginning with the first reported result and ending with the most recent results from monitoring for compliance with 1200-5-1-.36.

(II) You must certify that the samples were representative of the entire distribution system and that treatment and distribution system have not changed significantly since the samples were collected.

(III) Your study monitoring plan musts include a schematic of your distribution systems (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed or planned system specific study monitoring.

(IV) Your system specific study plan must specify the population served and system type (subpart H or ground water).

(V) You must retain a complete copy of your system specific study plan submitted under this paragraph (a)1, including any state modification of your system specific study plan, for as long as you are required to retain your IDSE report under subparagraph (b)5.

(VI) If you submit previously collected data that fully meet the number of samples required under paragraph (a)1(i)(II) and the state rejects some of the data, you must either conduct additional monitoring to replace rejected data on a schedule the state approves or conduct standard monitoring under 1200-5-1-.37(2).

2. Modeling. You may comply through analysis of an extended period simulation hydraulic model. The extended period simulation hydraulic model and analysis must meet the criteria in (a)2.

(i) Minimum requirements

(I) The model must simulate 24-hour variation in demand and show a consistently repeating 24-hour pattern of residence time.

(II) The model must represent the criteria listed in subparagraphs (a)2.(i)(II)I through IX.

I. 75% of pipe volume;

II. 50% of pipe length;

III. All pressure zones;

IV. All 12-inch diameter and larger pipes;

V. All 8-inch and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps and control valves, or are known or expected to be significant conveyors of water;

VI. All 6-inch and larger pipes that connects remote areas of a distribution system to the main portion of the system;

VII. All storage facilities with standard operations represented in the model;

VIII. All active pump stations with controls represented in the model; and

IX. All active control valves.

(III) The model must be calibrated, or have calibration plans, for the current configuration of the distribution system during the period of high TTHM formation potential. All storage facilities must be evaluated as part of the calibration process. All required calibration must be completed no later than 12-months after plan submission.

(ii) Reporting modeling. Your system specific study plan must include the information in (a)2(ii).

(I) Tabular or spreadsheet data demonstrating that the model meets requirements in subparagraph (a)2(i)(II).

(II) A description of all calibration activities undertaken, and if calibration is complete, a graph of predicted tank levels versus measured tank levels for the storage facility with the highest residence time in each pressure zone, and a time series graph of the residence time at the longest residence time storage facility in the distribution system showing the prediction for the entire simulation period (i.e. from time zero until the time it takes for the model to reach a consistently repeating pattern of residence time).

(III) Model input showing preliminary 24-hour average residence time predictions throughout the distribution system.

(IV) Timing and number of samples representative of the distribution systems planned for at least one monitoring period of TTHM and HAA5 dual sample monitoring at a number of locations no less than would be required for the system under standard monitoring in 1200-5-1-.37(2) during the historical month of high TTHM. These samples must be taken at locations other than existing compliance monitoring locations required by 1200-5-1-.36.

(V) Description of how all requirements will be completed no later than 12 months after you submit your system specific study plan.

(VI) Schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed system specific study monitoring (if calibration is complete) and all compliance monitoring results collected in accordance with 1200-5-1-.36.

(VII) Population served and system type (subpart H or ground water).

(VIII) You must retain a complete copy of your system specific study plan submitted under subparagraph (a)2, including any state modification of your system specific study plan, for as long as you are required to retain your IDSE report under subparagraph (b)7.

(iii) If you submit a model that does not fully meet the requirements under subparagraph (a)2, you must correct the deficiencies and respond to state inquiries concerning the model. If you fail to correct deficiencies or respond to inquiries to the state's satisfaction, you must conduct standard monitoring under 1200-5-1-.37(2).

b) *IDSE report.* Your IDSE report must include the elements required in subparagraphs (b)1 through (b)6 of this paragraph. You must submit your IDSE report according to the schedule in paragraph (1)(c).

1. Your IDSE report must include all TTHM and HAA5 analytical results from subpart L compliance monitoring and all system specific study monitoring conducted during the period of the system specific study presented in a tabular or spreadsheet format acceptable to the State. If changed from your system specific study plan submitted under subparagraph (a) of this paragraph, your IDSE report must also include a schematic of your distribution system, the population served, and system type (subpart H or ground water).

2. If you used the modeling provision under subparagraph (a)2 of this paragraph, you must include final information for the elements described in subparagraph (a)2(ii) of this paragraph, and a 24-hour time series graph of residence time for each subpart V compliance monitoring location selected.

3 You must recommend and justify subpart V compliance monitoring locations and timing based on the protocol in 1200-5-1-.37(6).

4. Your IDSE report must include an explanation of any deviations from your approved system specific study plan.

5. Your IDSE report must include the basis (analytical and modeling results) and justification you used to select the recommended subpart V monitoring locations.

6. You may submit your IDSE report in lieu of your system specific study plan on the schedule identified in paragraph (1)(c) for submission of the system specific study plan if you believe that you have the necessary information by the time that the system specific study plan is due. If you elect this approach, your IDSE report must also include all information required under subparagraph (a) of this paragraph.

7. You must retain a complete copy of your IDSE report submitted under this section for 10 years after the date that you submitted your IDSE report. If the State modifies the subpart V monitoring requirements that you recommended in your IDSE report or if the State approves alternative monitoring locations, you must keep a copy of the State's notification on file for 10 years after the date of the State's notification. You must make the IDSE report and any State notification available for review by the State or the public.

(4) 40/30 certification

(a) Eligibility. You are eligible for 40/30 certification if you had no TTHM or HAA5 monitoring violations under 1200-5-1-.36 and no individual sample exceeded 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 during an eight consecutive calendar quarter period beginning no earlier than the date specified below:

If your 40/30 certification is due	Then your eligibility for 40/30 certification is based on eight consecutive calendar quarters of compliance monitoring required by 1200-5-1-.36 beginning no earlier than [1]
(1) October 1, 2006	January 2004
(2) April 1, 2007	January 2004
(3)October 1, 2007	January 2005
(4) April 1, 2008	January 2005

[1]Unless you are on reduced monitoring under 1200-5-1-.36 and were not required to monitor during the specified period. If you did not monitor during the specified period, you must base your eligibility on compliance samples taken during the 12 months preceding the specified period.

(b) 40/30 certification.

1. You must certify to your state that every individual compliance sample taken under 1200-5-1-.36 during the period specified in subparagraph (a) was less than or equal to 0.040 mg/L for TTHM and 0.030mg/L for HAA5, and that you have not had any TTHM or HAA5 monitoring violations during the period specified in subparagraph (a).

2. The state may require you to submit compliance monitoring results, distribution system schematics and/or recommended LRAA compliance monitoring locations in addition to your certification. If you fail to submit the requested information, the state may require standard monitoring under 1200-5-1-.37(2) or a system specific study under 1200-5-1-.37(3).

3. The state may still require standard monitoring under 1200-5-1-.37(2) or a system specific study under 1200-5-1-.37(3) even if you meet the criteria in subparagraph (a).

4. You must retain a complete copy of your certification submitted for 10 years after the date that you submitted your certification. You must make the certification, all data upon which the certification is based, and any state notification available for review by the state or the public

(5) Very small system waivers

(a) If you serve fewer than 500 people and you have taken TTHM and HAA5 sample under 1200-5-1-.36 you are not required to comply with 1200-5-1-.37 unless the state notifies you that you must conduct standard monitoring under 1200-5-1-.37(2) or a system specific study under 1200-5-1-.37(3).

(b) If you have not taken TTHM and HAA5 samples under 1200-5-1-.36 or if the state notifies you that you must comply with 1200-5-1-.37, you must conduct standard monitoring under 1200-5-1-.37(2) or a system specific study under 1200-5-1-.37(3).

(6) LRAA compliance monitoring location recommendations

(a) Your IDSE report must include your recommendations and justification for where and during what month(s) TTHM and HAA5 monitoring for LRAA should be conducted. You must base your recommendations on the criteria in subparagraphs (b) through (e).

(b) You must select the number of monitoring locations specific in the table in subparagraph (b). You will use these recommended locations as LRAA compliance monitoring locations unless the state requires different or additional locations. You should distribute locations throughout the distribution system to the extent possible.

Source water type	Population size category	Monitoring frequency[1]	Distribution system monitoring location			
			Total per monitoring period[2]	Highest TTHM locations	Highest HAA5 locations	Existing compliance locations
Subpart H	<500	Per year	2	1	1	
	500-3,300	Per quarter	2	1	1	
	3,301-9,999	Per quarter	2	1	1	
	10,000-49,999	Per quarter	4	2	1	1
	50,000-249,999	Per quarter	8	3	3	2
	250,000-999,999	Per quarter	12	5	4	3
	1,000,000-499,000	Per quarter	16	6	6	4
	>5,000,000	Per quarter	20	8	7	5
Ground Water	<500	Per year	2	1	1	
	500-9,999	Per year	2	1	1	
	10,000-99,999	Per quarter	4	2	1	1
	100,000-499,999	Per quarter	6	3	2	1
	>5,000,000	Per quarter	8	3	3	2

[1]All systems must monitor during month of highest DBP concentrations.

[2]Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for subpart H systems serving 500-3,300. Systems on annual monitoring and subpart H systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. Only one location with a dual sample set per monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location and month if monitored annually.

(c) You must recommend LRAA compliance monitoring location based on standard monitoring results, system specific study results, and compliance monitoring results collected under 1200-5-1-.36. You must follow the protocol in subparagraphs (c)1 through (c)8. If required to monitor at more than eight locations, you must repeat the protocol as necessary. If you do not have existing compliance monitoring results collected under 1200-5-1-.36 or if you do not have enough existing compliance monitoring results taken under 1200-5-1-.36, you must repeat the protocol skipping the provisions of subparagraphs (c)3 and (c)7 as necessary, until you have identified the required total number of monitoring locations.

1. Location with the highest TTHM LRAA not previously selected as a LRAA monitoring location.

2. Location with the highest HAA5 LRAA not previously selected as a LRAA monitoring location.

3. Existing 1200-5-1-.36 average residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water system) with the highest HAA5 LRAA not previously selected as a LRAA monitoring location.

4. Location with the highest TTHM LRAA not previously selected as a LRAA monitoring location.

5. Location with the highest TTHM LRAA not previously selected as a LRAA monitoring location.

6. Location with the highest HAA5 LRAA not previously selected as a LRAA monitoring location.

7. Existing 1200-5-1-.36 average residence time compliance monitoring location (maximum residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water systems) with the highest TTHM LRAA not previously selected as a LRAA monitoring location.

8. Location with the highest HAA5 LRAA not previously selected as a LRAA monitoring location.

(d) You may recommend locations other than those specified in subparagraph (c) if you include a rationale for selecting other locations. If the state approves the alternate locations, you must monitor at these locations to determine compliance under 1200-5-1-.38.

(e) Your recommended schedule must include LRAA monitoring during the peak historical month for TTHM and HAA5 concentration, unless the state approves another month. Once you have identified the peak historical month, and if you are required to conduct routine monitoring at least quarterly, you must schedule LRAA compliance monitoring at a regular frequency of every 90 days or fewer.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Chapter 1200-5-1 is amended by the addition of Rule .38 Stage 2 Disinfection Byproducts Requirements (LRAA) so that as amended the Rule shall read:

1200-5-1-.38 Stage 2 Disinfection Byproducts Requirements (LRAA)

(1) General Requirements

(a) The requirements of this rule (subpart V) constitute national primary drinking water regulations. This rule establishes monitoring and other requirements for achieving compliance with maximum contaminant levels based on locational running annual averages (LRAA) for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5), and for achieving compliance with maximum residual disinfectant residuals for chlorine and chloramine for certain consecutive systems.

(b) Applicability. You are subject to these requirements if your system is a community water system or a nontransient noncommunity water system that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

(c) You must comply with the requirements in this rule on the schedule in the following table based on your system type.

If you are this type of system	You must comply with subpart V monitoring by: [1]
Systems that are not part of a combined distribution system and systems that serve the largest population in the combined distribution system	
System serving 100,000 or more	April 1, 2012
System serving 50,000–99,999	October 1, 2012
System serving 10,000–49,999	October 1, 2013.
System serving less than 10,000	October1, 2013 if no Cryptosporidium monitoring is required under 1200-5-1-.39(a)4 or October 1, 2014 if Cryptosporidium monitoring is required under 1200-5-1-.39(a)4 or (a)6.
Other systems that are part of a combined distribution system	
Consecutive system or wholesale system	—at the same time as the system with the earliest compliance date in the combined distribution system

[1]The State may grant up to an additional 24 months for compliance with MCLs and operational evaluaton levels if you require capital improvements to comply with an MCL.

1. Your monitoring frequency is specified in 1200-5-1-.38(1)(c).

(i) If you are required to conduct quarterly monitoring, you must begin monitoring in the first full calendar quarter that includes the compliance date in the table in subparagraph (c).

(ii) If you are required to conduct monitoring at a frequency that is less than quarterly, you must begin monitoring in the calendar month recommended in the IDSE report prepared under 1200-5-1-.37(2) or (3) or the calendar month identified in the subpart V (LRAA) monitoring plan developed under 1200-5-1-.38(3) no later than 12 months after the compliance date in this table.

2. If you are required to conduct quarterly monitoring, you must make compliance calculations at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter (or earlier if the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters). If you are required to conduct monitoring at a frequency that is less than quarterly, you must make compliance calculations beginning with the first compliance sample taken after the compliance date.

3. For the purpose of the schedule in subparagraph (c), the State may determine that the combined distribution system does not include certain consecutive systems based on factors such as receiving water from a wholesale system only on an emergency basis or receiving only a small percentage and small volume of water from a wholesale system. The State may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

(d) Monitoring and compliance.

1. Systems required to monitor quarterly. To comply with LRAA MCLs, you must calculate LRAAs for TTHM and HAA5 using monitoring results collected under 1200-5-1-.38 and determine that each LRAA does not exceed the MCL. If you fail to complete four consecutive quarters of monitoring, you must calculate compliance with the MCL based on the average of the available data from the most recent four quarters. If you take more than one sample per quarter at a monitoring location, you must average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

2. Systems required to monitor yearly or less frequently. To determine compliance with LRAAs, you must determine that each sample taken is less than the MCL. If any sample exceeds the MCL, you must comply with the requirements of 1200-5-1-.38(6). If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

(e) Violation. You are in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if you fail to monitor.

(2) Routine Monitoring

(a) Monitoring.

1. If you submitted an IDSE report, you must begin monitoring at the locations and months you have recommended in your IDSE report submitted under 1200-5-1-.37(6) following the schedule in 1200-5-1-.38(1)(c), unless the State requires other locations or additional locations after its review. If you submitted a 40/30 certification under 1200-5-1-.37(4) or you qualified for a very small system waiver under 1200-5-1-.37(5) or you are a

nontransient noncommunity water system serving <10,000, you must monitor at the location(s) and dates identified in your monitoring plan in 1200-5-1-.36, updated as required by 1200-5-1-38(3).

2. You must monitor at no fewer than the number of locations identified in subparagraph (a)2.

Source water type	Population size category	Monitoring Frequency [1]	Distribution system monitoring location total per monitoring period[2]
Subpart H	<500	per year	2
	500–3,300	per quarter	2
	3,301–9,999	per quarter	2
	10,000–49,999	per quarter	4
	50,000– 249,999	per quarter	8
	250,000–999,999	per quarter	12
	1,000,000– 4,999,999	per quarter	16
	>5,000,000	per quarter	20
Ground Water	<500	per year	2
	500–9,999	per year	2
	10,000–99,999	per quarter	4
	100,000– 499,999	per quarter	6
	>500,000	per quarter	8

[1] All systems must monitor during month of highest DBP concentrations.

[2] Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for subpart H systems serving 500–3,300. Systems on annual monitoring and subpart H systems serving 500–3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. Only one location with a dual sample set per monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location (and month, if monitored annually).

3. If you are an undisinfected system that begins using a disinfectant other than UV light after the dates in 1200-5-1-.37 for complying with the Initial Distribution System Evaluation requirements, you must consult with the State to identify compliance monitoring locations for LRAAs. You must then develop a monitoring plan under 1200-5-1-.38(3) that includes those monitoring locations.

(b) Analytical methods. You must use an approved method listed in 1200-5-1-.36 for TTHM and HAA5 analyses. Analyses must be conducted by laboratories that have received certification by EPA or the State as specified in 1200-5-1-.36.

(3) LRAA monitoring plan.

(a) 1. You must develop and implement a monitoring plan to be kept on file for State and public review. The monitoring plan must contain the elements in paragraphs (a)1(i) through (a)1(iv) and be complete no later than the date you conduct your initial monitoring under 1200-5-1-.38.

(i) Monitoring locations;

(ii) Monitoring dates;

(iii) Compliance calculation procedures; and

(iv) Monitoring plans for any other systems in the combined distribution system if the State has reduced monitoring requirements under the State authority in 40CFR142.16(m).

2. If you were not required to submit an IDSE report under either 1200-5-1-.37(2) or (3), and you do not have sufficient compliance monitoring locations under 1200-5-1-.36 to identify the required number of LRAA compliance monitoring locations indicated in 1200-5-1-.37(6)(b), you must identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of compliance monitoring locations have been identified. You must also provide the rationale for identifying the locations as having high levels of TTHM or HAA5. If you have more 1200-5-1-.36 monitoring locations than required for LRAA compliance monitoring in 1200-5-1-.37(6)(b), you must identify which locations you will use for LRAA compliance monitoring by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of LRAA compliance monitoring locations have been identified.

(b) If you are a subpart H system serving > 3,300 people, you must submit a copy of your monitoring plan to the State prior to the date you conduct your initial LRAA monitoring, unless your IDSE report submitted under 1200-5-1-.37 contains all the information required by this section.

(c) You may revise your monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for State-approved reasons, after consultation with the State regarding the need for changes and the appropriateness of changes. If you change monitoring locations, you must replace existing compliance monitoring locations with the lowest LRAA with new locations that reflect the current distribution system locations with expected high TTHM or HAA5 levels. The State may also require modifications in your monitoring plan. If you are a subpart H system serving > 3,300 people, you must submit a copy of your modified monitoring plan to the State prior to the date you are required to comply with the revised monitoring plan.

(4) Reduced monitoring.

(a) You may reduce monitoring to the level specified in the table in this paragraph (a) any time the LRAA is less than or equal to 0.040 mg/L for TTHM and less than or equal to 0.030 mg/L for HAA5 at all monitoring locations. You may only use data collected under the provisions 1200-5-1-.37 or .38 to qualify for reduced monitoring. In addition, the source water annual average TOC level, before any treatment, must be less than or equal to 4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either 1200-5-1-.36(6)(b)1(iii) or .36(6)(d).

Source water type	Population size category	Monitoring Frequency [1]	Distribution system monitoring location per monitoring period
Subpart H	<500	per year .	monitoring may not be reduced
	500–3,300	per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
	3,301–9,999	per year	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	10,000–49,999	per quarter	2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs
	50,000– 249,999	per quarter	4 dual sample sets—at the locations with the two highest TTHM and two highest HAA5 LRAAs
	250,000–999,999	per quarter	6 dual sample sets—at the locations with the three highest TTHM and three highest HAA5 LRAAs
	1,000,000–4,999,999	per quarter	8 dual sample sets—at the locations with the four highest TTHM and four highest HAA5 LRAAs.
	>5,000,000	per quarter	10 dual sample sets—at the locations with the five highest TTHM and five highest HAA5 LRAAs
Ground Water	<500	every third year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
	500–9,999	per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter
	10,000–99,999	per year	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	100,000–499,999	per quarter	2 dual sample sets; at the locations with the highest TTHM and highest HAA5 LRAAs.
	>500,000	per quarter	4 dual sample sets at the locations with the two highest TTHM and two highest HAA5 LRAAs.

[1] Systems on quarterly monitoring must take dual sample sets every 90 days.

(b) You may remain on reduced monitoring as long as the TTHM LRAA is less than or equal to 0.040 mg/L and the HAA5 LRAA less than or equal to 0.030 mg/L at each monitoring location (for systems with quarterly reduced monitoring) or each TTHM sample is less than or equal to 0.060 mg/L and each HAA5 sample is less than or equal to 0.045 mg/L (for systems with annual or less frequent monitoring). In addition, the source water annual average TOC level, before any treatment, must be less than or equal to 4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either 1200-5-1-.36(6)(b)1(iii) or .36(6)(d).

(c) If the LRAA based on quarterly monitoring at any monitoring location exceeds either 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 or if the annual (or less frequent) sample at any location exceeds either 0.060 mg/L for TTHM or 0.045 mg/L for HAA5, or if the source water annual average TOC level, before any treatment, is >4.0 mg/L at any treatment plant treating surface water or ground water under the direct influence of surface water, you must resume routine monitoring under 1200-5-1-.38(2) or begin increased monitoring if 1200-5-1-.38(6) applies.

(d) The State may return your system to routine monitoring at the State's discretion.

(5) Additional requirements for consecutive systems.

(a) If you are a consecutive system that does not add a disinfectant but delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light, you must comply with analytical and monitoring requirements for chlorine and chloramines in 1200-5-1-.36(5)(c) and 1200-5-1-.36(6)(c) and the compliance requirements in 1200-5-1-.36(7)(c)1 beginning April 1, 2009, unless required earlier by the State, and report monitoring results under 1200-5-1-.36(8)(c).

(6) Conditions requiring increased monitoring.

(a) If you are required to monitor at a particular location annually or less frequently than annually under 1200-5-1-.38(2) or (3), you must increase monitoring to dual sample sets once per quarter (taken every 90 days) at all locations if a TTHM sample is >0.080 mg/L or a HAA5 sample is >0.060 mg/L at any location.

(b) You are in violation of the MCL when the LRAA exceeds the MCLs in 1200-5-1-.06(6), calculated based on four consecutive quarters of monitoring (or the LRAA calculated based on fewer than four quarters of data if the MCL would be exceeded regardless of the monitoring results of subsequent quarters). You are in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if you fail to monitor.

(c) You may return to routine monitoring once you have conducted increased monitoring for at least four consecutive quarters and the LRAA for every monitoring location is less than or equal to 0.060 mg/L for TTHM and less than or equal to 0.045 mg/L for HAA5.

(7) Operational evaluation levels.

(a) You have exceeded the operational evaluation level at any monitoring location where the sum of the two previous quarters' TTHM results plus twice the current quarter's TTHM result, divided by 4 to determine an average, exceeds 0.080 mg/L, or where the sum of the two previous quarters' HAA5 results plus twice the current quarter's HAA5 result, divided by 4 to determine an average, exceeds 0.060 mg/L.

(b) 1. If you exceed the operational evaluation level, you must conduct an operational evaluation and submit a written report of the evaluation to the State no later than 90 days after being notified of the analytical result that causes you to exceed the operational evaluation level. The written report must be made available to the public upon request.

2. Your operational evaluation must include an examination of system treatment and distribution operational practices, including storage tank operations, excess storage capacity, distribution system flushing, changes in sources or source water quality, and treatment changes or problems that may contribute to TTHM and HAA5 formation and what steps could be considered to minimize future exceedences.

(i) You may request and the State may allow you to limit the scope of your evaluation if you are able to identify the cause of the operational evaluation level exceedance.

(ii) Your request to limit the scope of the evaluation does not extend the schedule in subparagraph (b)1 for submitting the written report. The State must approve this limited scope of evaluation in writing and you must keep that approval with the completed report.

(8) Requirements for remaining on reduced TTHM and HAA5 monitoring based on 1200-5-1-.36 results.

(a) You may remain on reduced monitoring after the dates identified in 1200-5-1-.38(1)(c) for compliance with this rule only if you qualify for a 40/30 certification under 1200-5-1-.37(4) or have received a very small system waiver under 1200-5-1-.37(5), plus you meet the reduced monitoring criteria in 1200-5-1-.38(4)(a), and you do not change or add monitoring locations from those used for compliance monitoring under 1200-5-1-.36. If your monitoring locations under this rule differ from your monitoring locations under 1200-5-1-.36 (subpart L), you may not remain on reduced monitoring after the dates identified in 1200-5-1-.38(1)(c) for compliance with this rule.

(9) Requirements for remaining on increased TTHM and HAA5 monitoring based on Subpart L results.

(a) If you were on increased monitoring under 1200-5-1-.36(6)(b)1, you must remain on increased monitoring until you qualify for a return to routine monitoring under 1200-5-1-.38(6)(c). You must conduct increased monitoring under 1200-5-1-.38(6) at the monitoring locations in the monitoring plan developed under 1200-5-1-.38(3) beginning at the date identified in 1200-5-1-.38(1)(c) for compliance with this rule and remain on increased monitoring until you qualify for a return to routine monitoring under 1200-5-1-.38(6)(c).

(10) Reporting and Recordkeeping Requirements

(a) Reporting.

1. You must report the following information for each monitoring location to the State within 10 days of the end of any quarter in which monitoring is required:

(i) Number of samples taken during the last quarter.

(ii) Date and results of each sample taken during the last quarter.

(iii) Arithmetic average of quarterly results for the last four quarters for each monitoring location (LRAA), beginning at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter. If the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters, you must report this information to the State as part of the first report due following the compliance date or anytime thereafter that this determination is made. If you are required to conduct monitoring at a frequency that is less than quarterly, you must make compliance calculations beginning with the first compliance sample taken after the compliance date, unless you are required to conduct increased monitoring under 1200-5-1-.38(6).

(iv) Whether, based on 1200-5-1-.06(6) and this rule, the MCL was violated at any monitoring location.

(v) Any operational evaluation levels that were exceeded during the quarter and, if so, the location and date, and the calculated TTHM and HAA5 levels.

2. If you are a subpart H system seeking to qualify for or remain on reduced TTHM/HAA5 monitoring, you must report the following source water TOC information for each treatment plant that treats surface water or ground water under the direct influence of surface water to the State within 10 days of the end of any quarter in which monitoring is required:

(i) The number of source water TOC samples taken each month during last quarter.

(ii) The date and result of each sample taken during last quarter.

(iii) The quarterly average of monthly samples taken during last quarter or the result of the quarterly sample.

(iv) The running annual average (RAA) of quarterly averages from the past four quarters.

(v) Whether the RAA exceeded 4.0 mg/L.

3. The State may choose to perform calculations and determine whether the MCL was exceeded or the system is eligible for reduced monitoring in lieu of having the system report that information

(b) Recordkeeping. You must retain any LRAA (subpart V) monitoring plans and your LRAA monitoring results as required by 1200-5-1-.20.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

Amendments

Chapter 1200-5-1 is amended by the addition of Rule .39 Enhanced Treatment for Cryptosporidium so that as amended the Rule shall read:

(1) General requirements.

(a) The requirements of this rule are national primary drinking water regulations. The regulations establish or extend treatment technique requirements in lieu of maximum contaminant levels for *Cryptosporidium.* These requirements are in addition to requirements for filtration and disinfection in 1200-5-1-.31.

(b) Applicability. The requirements of this rule apply to all subpart H systems, which are public water systems supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water (GWUDI).

1. Wholesale systems, as defined in 1200-5-1-.04, must comply with the requirements of this rule based on the population of the largest system in the combined distribution system.

2. The requirements of this rule for filtered systems apply to systems required by National Primary Drinking Water Regulations to provide filtration treatment, whether or not the system is currently operating a filtration system.

3. The requirements of this rule for unfiltered systems apply only to unfiltered systems that timely met and continue to meet the filtration avoidance criteria in 1200-5-1-.31, as applicable.

(c) Requirements. Systems subject to this rule must comply with the following requirements:

1. Systems must conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. This monitoring may include sampling for *Cryptosporidium, E. coli,* and turbidity as described in paragraphs (2) through (7), to determine what level, if any, of additional *Cryptosporidium* treatment they must provide.

2. Systems that plan to make a significant change to their disinfection practice must develop disinfection profiles and calculate disinfection benchmarks, as described in paragraph (9) through (10).

3. Filtered systems must determine their *Cryptosporidium* treatment bin classification as described in paragraph (11) and provide additional treatment for *Cryptosporidium,* if required, as described in paragraph (12). All unfiltered systems must provide treatment for *Cryptosporidium* as described in paragraph (13). Filtered and unfiltered systems must implement *Cryptosporidium* treatment according to the schedule in paragraph (14).

4. Systems with uncovered finished water storage facilities must comply with the requirements to cover the facility or treat the discharge from the facility as described in paragraph (15).

5. Systems required to provide additional treatment for *Cryptosporidium* must implement microbial toolbox options that are designed and operated as described in paragraph (16) through paragraph (21).

6. Systems must comply with the applicable recordkeeping and reporting requirements described in paragraph (22) through paragraph (23).

7. Systems must address significant deficiencies identified in sanitary surveys performed by the state or EPA as described in paragraph (24).

(2) Source water monitoring.

(a) Initial round of source water monitoring. Systems must conduct the following monitoring on the schedule in subparagraph (c) unless they meet the monitoring exemption criteria in subparagraph (d) of this paragraph.

1. Filtered systems serving at least 10,000 people must sample their source water for *Cryptosporidium, E. coli,* and turbidity at least monthly for 24 months.

2. Unfiltered systems serving at least 10,000 people must sample their source water for *Cryptosporidium* at least monthly for 24 months.

3. (i) Filtered systems serving fewer than 10,000 people must sample their source water for *E. coli* at least once every two weeks for 12 months.

(ii) A filtered system serving fewer than 10,000 people may avoid *E. coli* monitoring if the system notifies the State that it will monitor for *Cryptosporidium* as described in subparagraph (a)4. The system must notify the State no later than 3 months prior to the date the system is otherwise required to start *E. coli* monitoring under paragraph (2)(c).

4. Filtered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months if they meet one of the following, based on monitoring conducted under subparagraph (a)3:

(i) For systems using lake/reservoir sources, the annual mean *E. coli* concentration is greater than 10 *E. coli*/ 100 mL.

(ii) For systems using flowing stream sources, the annual mean *E. coli* concentration is greater than 50 *E. coli*/ 100 mL.

(iii) The system does not conduct *E. coli* monitoring as described in paragraph (a)3.

(iv) Systems using ground water under the direct influence of surface water (GWUDI) must comply with the requirements of paragraph (a)4 based on the *E. coli* level that applies to the nearest surface water body. If no surface water body is nearby, the system must comply based on the requirements that apply to systems using lake/reservoir sources.

5. For filtered systems serving fewer than 10,000 people, the State may approve monitoring for an indicator other than *E. coli* under paragraph (a)3. The State also may approve an alternative to the *E. coli* concentration in paragraph (a)4(i), (ii) or (iv) to trigger *Cryptosporidium* monitoring. This approval by the State must be provided to the system in writing and must include the basis for the State's determination that the alternative indicator and/or trigger level will provide a more accurate identification of whether a system will exceed the Bin 1 *Cryptosporidium* level in paragraph (11).

6. Unfiltered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months.

7. Systems may sample more frequently than required if the sampling frequency is evenly spaced throughout the monitoring period.

(b) Second round of source water monitoring. Systems must conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in paragraph (a), unless they meet the monitoring exemption criteria in paragraph (d). Systems must conduct this monitoring on the schedule in subparagraph (c).

(c) Monitoring schedule. Systems must begin the monitoring required in subparagraphs (a) and (b) no later than the month beginning with the date listed in this table:

SOURCE WATER MONITORING STARTING DATES TABLE

Systems that serve	Must begin the first round of source water monitoring no later than the month beginning . . .	And must begin the second round of source water monitoring no later than the month beginning . . .
(1) At least 100,000 people	(i) October 1, 2006	(ii) April 1, 2015.
(2) From 50,000 to 99,999 people	(i) April 1, 2007	(ii) October 1, 2015
(3) From 10,000 to 49,999 people	(i) April 1, 2008	(ii) October 1, 2016.
(4) Fewer than 10,000 and monitor for *E. coli* [a]	(i) October 1, 2008	(ii) October 1, 2017.
(5) Fewer than 10,000 and monitor for *Cryptosporidium* b.	(i) April 1, 2010	(ii) April 1, 2019

[a] Applies only to filtered systems.

[b] Applies to filtered systems that meet the conditions of paragraph (a)4 and unfiltered systems.

(d) Monitoring avoidance.

1. Filtered system are not required to conduct source water monitoring under this rule if the system will provide a total of at least 5.5-log of treatment for *Cryptosporidium,* equivalent to meeting the treatment requirements of Bin 4 in paragraph (12).

2. Unfiltered systems are not required to conduct source water monitoring under this rule if the system will provide a total of at least 3-log *Cryptosporidium* inactivation,

equivalent to meeting the treatment requirements for unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L in paragraph (13).

3. If a system chooses to provide the level of treatment in subparagraph (d)1 or 2, as applicable, rather than start source water monitoring, the system must notify the State in writing no later than the date the system is scheduled for monitoring under paragraph (3). Alternatively, a system may choose to stop sampling at any point after it has initiated monitoring if it notifies the State in writing that it will provide this level of treatment. Systems must install and operate technologies to provide this level of treatment by the applicable treatment compliance date in paragraph (14).

(e) Plants operating only part of the year. Systems with subpart H plants that operate for only part of the year must conduct source water monitoring in accordance with this rule, but with the following modifications:

1. Systems must sample their source water only during the months that the plant operates unless the State specifies another monitoring period based on plant operating practices.

2. Systems with plants that operate less than six months per year and that monitor for *Cryptosporidium* must collect at least six *Cryptosporidium* samples per year during each of two years of monitoring. Samples must be evenly spaced throughout the period the plant operates.

(f) 1. New sources. A system that begins using a new source of surface water or GWUDI after the system is required to begin monitoring under subparagraph (c) must monitor the new source on a schedule the State approves. Source water monitoring must meet the requirements of this rule. The system must also meet the bin classification and *Cryptosporidium* treatment requirements of paragraphs (11) and (12) or (13), as applicable, for the new source on a schedule the State approves.

2. The requirements of paragraph (2) apply to subpart H systems that begin operation after the monitoring start date applicable to the system's size under subparagraph (c).

3. The system must begin a second round of source water monitoring no later than 6 years following initial bin classification under paragraph (11) or determination of the mean *Cryptosporidium* level under paragraph (13), as applicable.

(g) Failure to collect any source water sample required under this section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory, and reporting requirements of paragraphs (3) through (7) is a monitoring violation.

(h) Grandfathering monitoring data. Systems may use (grandfather) monitoring data collected prior to the applicable monitoring start date in subparagraph (c) to meet the initial source water monitoring requirements in subparagraph (a). Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this paragraph must meet the requirements in paragraph (8).

(3) Sampling schedules.

(a) Systems required to conduct source water monitoring under paragraph (2) must submit a sampling schedule that specifies the calendar dates when the system will collect each required sample.

1. Systems must submit sampling schedules no later than 3 months prior to the applicable date listed in paragraph (2)(c) for each round of required monitoring.

2. (i) Systems serving at least 10,000 people must submit their sampling schedule for the initial round of source water monitoring under paragraph (2)(a) to the state and to the EPA electronically at *https:// intranet.epa.gov/lt2/.*

(ii) If a system is unable to submit the sampling schedule electronically, the system may use an alternative approach for submitting the sampling schedule that EPA approves.

3. Systems serving fewer than 10,000 people must submit their sampling schedules for the initial round of source water monitoring under paragraph (2)(a) to the State.

4. Systems must submit sampling schedules for the second round of source water monitoring under paragraph (2)(b) to the State.

5. If EPA or the State does not respond to a system regarding its sampling schedule, the system must sample at the reported schedule.

(b) Systems must collect samples within two days before or two days after the dates indicated in their sampling schedule (i.e., within a five-day period around the schedule date) unless one of the conditions of subparagraph (b)1 or 2 applies.

1. If an extreme condition or situation exists that may pose danger to the sample collector, or that cannot be avoided and causes the system to be unable to sample in the scheduled five-day period, the system must sample as close to the scheduled date as is feasible unless the State approves an alternative sampling date. The system must submit an explanation for the delayed sampling date to the State concurrent with the shipment of the sample to the laboratory.

2 (i) If a system is unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements in paragraph (5), or the failure of an approved laboratory to analyze the sample, then the system must collect a replacement sample.

(ii) The system must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date unless the system demonstrates that collecting a replacement sample within this time frame is not feasible or the State approves an alternative resampling date. The system must submit an explanation for the delayed sampling date to the State concurrent with the shipment of the sample to the laboratory.

(c) Systems that fail to meet the criteria of subparagraph (b) for any source water sample required under paragraph (2) must revise their sampling schedules to add dates for collecting all missed samples. Systems must submit the revised schedule to the State for approval prior to when the system begins collecting the missed samples.

(4) Sampling locations.

(a) Systems required to conduct source water monitoring under paragraph (2) must collect samples for each plant that treats a surface water or GWUDI source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the State may approve one set of monitoring results to be used to satisfy the requirements of paragraph (2) for all plants.

(b) 1. Systems must collect source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants, unless the system meets the condition of subparagraph (b)2.

2. The State may approve a system to collect a source water sample after chemical treatment. To grant this approval, the State must determine that collecting a sample prior to chemical treatment is not feasible for the system and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample.

(c) Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition.

(d) Bank filtration.

1. Systems that receive *Cryptosporidium* treatment credit for bank filtration under 1200-5-.31(4)(b) or (d), as applicable, must collect source water samples in the surface water prior to bank filtration.

2. Systems that use bank filtration as pretreatment to a filtration plant must collect source water samples from the well (i.e., after bank filtration). Use of bank filtration during monitoring must be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive treatment credit for the bank filtration under paragraph (18)(c).

(e) Multiple sources. Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, must collect samples as specified in subparagraph (e)1 or 2. The use of multiple sources during monitoring must be consistent with routine operational practice.

1. If a sampling tap is available where the sources are combined prior to treatment, systems must collect samples from the tap.

2. If a sampling tap where the sources are combined prior to treatment is not available, systems must collect samples at each source near the intake on the same day and must follow either subparagraph (e)2(i) or (ii) for sample analysis.

(i) Systems may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.

(ii) Systems may analyze samples from each source separately and calculate a weighted average of the analysis results for each sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source contributed to total plant flow at the time the sample was collected and then summing these values.

(f) Additional Requirements. Systems must submit a description of their sampling location(s) to the State at the same time as the sampling schedule required under paragraph (3). This description must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle. If the State does not respond to a system regarding sampling location(s), the system must sample at the reported location(s).

(5) Analytical methods.

(a) *Cryptosporidium.* Systems must analyze for *Cryptosporidium* using *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA,* 2005, United States Environmental Protection Agency, EPA–815-R–05–002 or *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA,* 2005, United States Environmental Protection Agency, EPA–815–R–05–001, which are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods online from *http:// www.epa.gov/safewater/disinfection/lt2* or from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave., NW, Washington, DC 20460 (Telephone: 800–426–4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202–566–2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: h*ttp://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

1. Systems must analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in subparagraph (a). Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters approved by EPA for the methods listed in subparagraph (a), up to a packed pellet volume of at least 2 mL.

2. (i) Matrix spike (MS) samples, as required by the methods in subparagraph (a) of this paragraph, must be spiked and filtered by a laboratory approved for *Cryptosporidium* analysis under paragraph (6).

   (ii) If the volume of the MS sample is greater than 10 L, the system may filter all but 10 L of the MS sample in the field, and ship the filtered sample and the remaining 10 L of source water to the laboratory. In this case, the laboratory must spike the remaining 10 L of water and filter it through the filter used to collect the balance of the sample in the field.

3. Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery (OPR) samples.

(b) *E. coli.* Systems must use methods for enumeration of E. coli in source water approved in 40CFR141.136(3)(a) or 1200-5-1-.31.

1. The time from sample collection to initiation of analysis may not exceed 30 hours unless the system meets the condition of subparagraph (b)2.

2. The State may approve on a case-by-case basis the holding of an *E. coli* sample for up to 48 hours between sample collection and initiation of analysis if the State determines that analyzing an *E. coli* sample within 30 hours is not feasible. *E. coli* samples held between 30 to 48 hours must be analyzed by the Colilert reagent version of Standard Method 9223B as listed in 40CFR 136.3(a).

3. Systems must maintain samples between 0°C and 10°C during storage and transit to the laboratory.

(c) Turbidity. Systems must use methods for turbidity measurement approved in 1200-5-1-.31(5)(a)4..

(6) Approved laboratories.

(a) *Cryptosporidium.* Systems must have *Cryptosporidium* samples analyzed by a laboratory that is approved under EPA's Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water or a laboratory that has been certified for *Cryptosporidium* analysis by an equivalent State laboratory certification program.

(b) *E. coli.* Any laboratory certified by the EPA, the National Environmental Laboratory Accreditation Conference or the State for total coliform or fecal coliform analysis under 1200-5-1-.31 is approved for *E. coli* analysis under this rule when the laboratory uses the same technique for *E. coli* that the laboratory uses to count the number of *e-coli* colonies under 1200-5-1-.31.

(c) Turbidity. Measurements of turbidity must be made by a party approved by the State.

(7) Reporting source water monitoring results.

(a) Systems must report results from the source water monitoring required under paragraph (2) no later than 10 days after the end of the first month following the month when the sample is collected.

(b) 1. All systems serving at least 10,000 people must report the results from the initial source water monitoring required under paragraph (2)(a) to EPA electronically at *https:// intranet.epa.gov/lt2/.*

2. If a system is unable to report monitoring results electronically, the system may use an alternative approach for reporting monitoring results that EPA approves.

(c) Systems serving fewer than 10,000 people must report results from the initial source water monitoring required under paragraph (2)(a) to the State.

(d) All systems must report results from the second round of source water monitoring required under paragraph (2) to the State.

(e) Systems must report the applicable information in subparagraphs (e)1 and 2 for the source water monitoring required under paragraph (2).

1. Systems must report the following data elements for each *Cryptosporidium* analysis: PWSID, Facility ID, Sample collection date, Sample type (field or matrix spike), Sample volume filtered (L), to nearest 0.25 L. Was 100% of filtered volume examined, Number of oocysts counted.

(i) For matrix spike samples, systems must also report the sample volume spiked and estimated number of oocysts spiked. These data are not required for field samples.

(ii) For samples in which less than 10 L is filtered or less than 100% of the sample volume is examined, systems must also report the number of filters used and the packed pellet volume.

(iii) For samples in which less than 100% of sample volume is examined, systems must also report the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.

2. Systems must report the following data elements for each *E. coli* analysis: PWSID, Facility ID, Sample collection date, Analytical method number, Method type, Source type (flowing stream, lake/reservoir, GWUDI), *E. coli*/100 mL, Turbidity. Systems serving fewer than 10,000 people that are not required to monitor for turbidity under paragraph (2) are not required to report turbidity with their *E. coli* results.

(8) Grandfathering previously collected data.

(a) 1. Systems may comply with the initial source water monitoring requirements of paragraph (2)(a) by grandfathering sample results collected before the system is required to begin monitoring (i.e., previously collected data). To be grandfathered, the sample results and analysis must meet the criteria in this paragraph and the State must approve.

2. A filtered system may grandfather *Cryptosporidium* samples to meet the requirements of paragraph (2)(a) when the system does not have corresponding *E. coli* and turbidity samples. A system that grandfathers *Cryptosporidium* samples without *E. coli* and turbidity samples is not required to collect *E. coli* and turbidity samples when the system completes the requirements for *Cryptosporidium* monitoring under paragraph (2)(a).

(b) *E. coli* sample analysis. The analysis of *E. coli* samples must meet the analytical method and approved laboratory requirements of paragraphs (5) through (6).

(c) *Cryptosporidium* sample analysis. The analysis of *Cryptosporidium* samples must meet the criteria in this paragraph.

1. Laboratories analyzed *Cryptosporidium* samples using one of the analytical methods in paragraphs (c)1(i) through (vi), which are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods on-line from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave, NW, Washington, DC 20460 (Telephone: 800–426–4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202–566– 2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/ federal_ register/code_of_federal_ regulations/ibr_locations.html.*

(i) Method 1623*: Cryptosporidium and Giardia in Water by Filtration/IMS/ FA,* 2005, United States Environmental Protection Agency, EPA–815–R–05–002.

(ii) Method 1622*: Cryptosporidium in Water by Filtration/IMS/FA,* 2005, United States Environmental Protection Agency, EPA–815–R–05–001.

(iii) Method 1623: *Cryptosporidium and Giardia in Water by Filtration/IMS/ FA,* 2001, United States Environmental Protection Agency, EPA–821–R–01–025.

(iv) Method 1622*: Cryptosporidium in Water by Filtration/IMS/FA,* 2001, United States Environmental Protection Agency, EPA–821–-R–01–026.

(v) Method 1623*: Cryptosporidium and Giardia in Water by Filtration/IMS/ FA,* 1999, United States Environmental Protection Agency, EPA–821–R–99–006.

(vi) Method 1622*: Cryptosporidium in Water by Filtration/IMS/FA,* 1999, United States Environmental Protection Agency, EPA–821–R–99–001.

2. For each *Cryptosporidium* sample, the laboratory analyzed at least 10 L of sample or at least 2 mL of packed pellet or as much volume as could be filtered by 2 filters that EPA approved for the methods listed in subparagraph (c)1.

(d) Sampling location. The sampling location must meet the conditions in paragraph (4).

(e) Sampling frequency. *Cryptosporidium* samples were collected no less frequently than each calendar month on a regular schedule, beginning no earlier than January 1999. Sample collection intervals may vary for the conditions specified in paragraph (3)(b)1 and 2 if the system provides documentation of the condition when reporting monitoring results.

1. The State may approve grandfathering of previously collected data where there are time gaps in the sampling frequency if the system conducts additional monitoring the State specifies to ensure that the data used to comply with the initial source water monitoring requirements of paragraph (2)(a) are seasonally representative and unbiased.

2. Systems may grandfather previously collected data where the sampling frequency within each month varied. If the *Cryptosporidium* sampling frequency varied, systems must follow the monthly averaging procedure in paragraph (11)(b)5 or paragraph (13)(a)3, as applicable, when calculating the bin classification for filtered systems or the mean *Cryptosporidium* concentration for unfiltered systems.

(f) Reporting monitoring results for grandfathering. Systems that request to grandfather previously collected monitoring results must report the following information by the applicable dates listed in this subparagraph. Systems serving at least 10,000 people must report this information to EPA unless the State approves reporting to the State rather than EPA. Systems serving fewer than 10,000 people must report this information to the State.

1. Systems must report that they intend to submit previously collected monitoring results for grandfathering. This report must specify the number of previously collected results the system will submit, the dates of the first and last sample, and whether a system will conduct additional source water monitoring to meet the requirements of paragraph (2)(a). Systems must report this information no later than the date the sampling schedule under paragraph (3) is required.

2. Systems must report previously collected monitoring results for grandfathering, along with the associated documentation listed in subparagraphs (f)2(i) through (iv), no later than two months after the applicable date listed in paragraph (2)(c).

(i) For each sample result, systems must report the applicable data elements in paragraph (7).

(ii) Systems must certify that the reported monitoring results include all results the system generated during the time period beginning with the first reported result and ending with the final reported result. This applies to samples that were collected from the sampling location specified for source water monitoring under this rule, not spiked, and analyzed using the laboratory's routine process for the analytical methods listed in this section.

(iii) Systems must certify that the samples were representative of a plant's source water(s) and the source water(s) have not changed. Systems must report a description of the sampling location(s), which must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including points of chemical addition and filter backwash recycle.

(iv) For *Cryptosporidium* samples, the laboratory or laboratories that analyzed the samples must provide a letter certifying that the quality control criteria specified in the methods listed in subparagraph (c)1 were met for each sample batch associated with the reported results. Alternatively, the laboratory may provide bench sheets and sample examination report forms for each field, matrix spike, IPR, OPR, and method blank sample associated with the reported results.

(g) If the State determines that a previously collected data set submitted for grandfathering was generated during source water conditions that were not normal for the system, such as a drought, the State may disapprove the data. Alternatively, the State may approve the previously collected data if the system reports additional source water monitoring data, as determined by the State, to ensure that the data set used under paragraph (11) or paragraph (13) represents average source water conditions for the system.

(h) If a system submits previously collected data that fully meet the number of samples required for initial source water monitoring under paragraph (2)(a) and some of the data are rejected due to not meeting the requirements of this paragraph, systems must conduct additional monitoring to replace rejected data on a schedule the State approves. Systems are not required to begin this additional monitoring until two months after notification that data have been rejected and additional monitoring is necessary.

(9) Requirements when making a significant change in disinfection practice.

(a) Following the completion of initial source water monitoring under paragraph (2)(a), a system that plans to make a significant change to its disinfection practice, as defined in subparagraph (b), must develop disinfection profiles and calculate disinfection benchmarks for *Giardia lamblia* and viruses as described in paragraph (10). Prior to changing the disinfection practice, the system must notify the State and must include in this notice the information in subparagraphs (a)1 through 3.

1. A completed disinfection profile and disinfection benchmark for *Giardia lamblia* and viruses as described in paragraph (10).

2. A description of the proposed change in disinfection practice.

3. An analysis of how the proposed change will affect the current level of disinfection.

(b) Significant changes to disinfection practice are defined as follows:

1. Changes to the point of disinfection;

2. Changes to the disinfectant(s) used in the treatment plant;

3. Changes to the disinfection process; or

4. Any other modification identified by the State as a significant change to disinfection practice.

(10) Developing the disinfection profile and benchmark.

(a) Systems required to develop disinfection profiles under paragraph (9) must follow the requirements of this paragraph. Systems must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for *Giardia lamblia* and viruses. If systems monitor more frequently, the monitoring frequency must be evenly spaced. Systems that operate for fewer than 12 months per year must monitor weekly during the period of operation. Systems must determine log inactivation for *Giardia lamblia* through the entire plant, based on $CT_{99.9}$ values in Tables 1.1 through 1.6, 2.1 and 3.1 of 1200-5-1-.31(5)(b) as applicable. Systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the State.

(b) Systems with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in subparagraphs (b)1 through 4. Systems with more than one point of disinfectant application must conduct the monitoring in subparagraphs (b)1

through 4 for each disinfection segment. Systems must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in 1200-5-1-.31(5)(a).

1. For systems using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.

2. For systems using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.

3. The disinfectant contact time(s) (T) must be determined during peak hourly flow.

4. The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfectant application must be measured during peak hourly flow.

(c) In lieu of conducting new monitoring under subparagraph (b), systems may elect to meet the requirements of subparagraphs (c)1 or 2.

1. Systems that have at least one year of existing data that are substantially equivalent to data collected under the provisions of subparagraph (b) may use these data to develop disinfection profiles as specified in this paragraph if the system has neither made a significant change to its treatment practice nor changed sources since the data were collected. Systems may develop disinfection profiles using up to three years of existing data.

2. Systems may use disinfection profile(s) developed under 1200-5-1-.31 in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Systems that have not developed a virus profile under 1200-5-1-.31 must develop a virus profile using the same monitoring data on which the *Giardia lamblia* profile is based.

(d) Systems must calculate the total inactivation ratio for *Giardia lamblia* as specified in subparagraphs (d)1 through 3 of this paragraph.

1. Systems using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the methods in subparagraph (d)1(i) or (ii) of this paragraph.

   (i) Determine one inactivation ratio (CTcalc/CT99.9) before or at the first customer during peak hourly flow.

   (ii) Determine successive CTcalc/ CT99.9 values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The system must calculate the total inactivation ratio by determining (CTcalc/CT99.9) for each sequence and then adding the (CTcalc/ CT99.9) values together to determine (Σ (CTcalc/CT99.9)).

2. Systems using more than one point of disinfectant application before the first customer must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The (CTcalc/ CT99.9) value of each segment and (Σ (CTcalc/CT99.9)) must be calculated using the method in subparagraph (d)1(ii) of this paragraph.

3. The system must determine the total logs of inactivation by multiplying the value calculated in subparagraph (d)1 or (d)2 of this paragraph by 3.0.

4. Systems must calculate the log of inactivation for viruses using a protocol approved by the State.

(e) Systems must use the procedures specified in subparagraphs (e)1 and 2 of this paragraph to calculate a disinfection benchmark.

1. For each year of profiling data collected and calculated under subparagraphs (a) through (d) of this paragraph, systems must determine the lowest mean monthly level of both *Giardia lamblia* and virus inactivation. Systems must determine the mean *Giardia lamblia* and virus inactivation for each calendar month for each year of profiling data by dividing the sum of daily or weekly *Giardia lamblia* and virus log inactivation by the number of values calculated for that month.

2. The disinfection benchmark is the lowest monthly mean value (for systems with one year of profiling data) or the mean of the lowest monthly mean values (for systems with more than one year of profiling data) of *Giardia lamblia* and virus log inactivation in each year of profiling data.

(11) Bin classification for filtered systems.

(a) Following completion of the initial round of source water monitoring required under paragraph (2)(a), filtered systems must calculate an initial *Cryptosporidium* bin concentration for each plant for which monitoring was required. Calculation of the bin concentration must use the *Cryptosporidium* results reported under paragraph (2)(a) and must follow the procedures in subparagraphs (b)1 through 5 of this paragraph.

(b) 1. For systems that collect a total of at least 48 samples, the bin concentration is equal to the arithmetic mean of all sample concentrations.

2. For systems that collect a total of at least 24 samples, but not more than 47 samples, the bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.

3. For systems that serve fewer than 10,000 people and monitor for *Cryptosporidium* for only one year (i.e., collect 24 samples in 12 months), the bin concentration is equal to the arithmetic mean of all sample concentrations.

4. For systems with plants operating only part of the year that monitor fewer than 12 months per year under paragraph (2)(e), the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of *Cryptosporidium* monitoring.

5. If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in subparagraphs (b)1 through 4 of this paragraph.

(c) Filtered systems must determine their initial bin classification from the following table and using the *Cryptosporidium* bin concentration calculated under subparagraphs (a)–(b) of this paragraph:

BIN CLASSIFICATION TABLE FOR FILTERED SYSTEMS

For systems that are:	With a *Cryptosporidium* bin concentration of [1]	The bin classification is
required to monitor for *Cryptosporidium* under1200-5-1-.39(2)	*Cryptosporidium* <0.075 oocysts/L	Bin 1
	0.075 oocysts/L <1.0 oocysts/L	Bin 2.
	1.0 oocysts/L <3.0 oocysts/L ...	Bin 3.
	Greater than or equal to 3.0 oocysts/L	Bin 4.
serving fewer than 10,000 people and NOT required to monitor for *Cryptosporidium* under 1200-5-1-.39(2)(a)4.	NA	Bin 1

[1] Based on calculations in subparagraph (a) or (d) of this paragraph, as applicable.

(d) Following completion of the second round of source water monitoring required under paragraph (2)(b), filtered systems must recalculate their *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under paragraph (2)(b) and following the procedures in paragraphs (b)1 through 4 of this paragraph. Systems must then redetermine their bin classification using this bin concentration and the table in subparagraph (c) of this paraagraph.

(e) 1. Filtered systems must report their initial bin classification under subparagraph (c) of this paragraph to the State for approval no later than 6 months after the system is required to complete initial source water monitoring based on the schedule in paragraph (2)(c).

2. Systems must report their bin classification under subparagraph (d) of this paragraph to the State for approval no later than 6 months after the system is required to complete the second round of source water monitoring based on the schedule in paragraph (2)(c).

3. The bin classification report to the State must include a summary of source water monitoring data and the calculation procedure used to determine bin classification.

(f) Failure to comply with the conditions of subparagraph (e) of this paragraph is a violation of the treatment technique requirement.

(12) Filtered system additional *Cryptosporidium* treatment requirements.

(a) Filtered systems must provide the level of additional treatment for *Cryptosporidium* specified in this paragraph based on their bin classification as determined under paragraph (11) and according to the schedule in paragraph (14).

	And the system uses the following filtration treatment in full compliance with 1200-5-1-.31 (as applicable), then the additional *Cryptosporidium* treatment requirements are . . .			
If the system bin classification is	Conventional filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration	Alternative filtration technologies
Bin 1	No additional treatment	No additional treatment	No additional treatment	No additional treatment.
Bin 2	1-log treatment	1.5-log treatment	1-log treatment	([1])
Bin 3	2-log treatment	2.5-log treatment	2-log treatment	([2])
Bin 4	2.5-log treatment	3-log treatment	2.5-log treatment	([3])

[1] As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 4.0-log.
[2] As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 5.0-log.
[3] As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 5.5-log.

(b) 1. Filtered systems must use one or more of the treatment and management options listed in paragraph (16), termed the microbial toolbox, to comply with the additional *Cryptosporidium* treatment required in subparagraph (a) of this paragraph.

2. Systems classified in Bin 3 and Bin 4 must achieve at least 1-log of the additional *Cryptosporidium* treatment required under subparagraph (a) of this paragraph using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or UV, as described in paragraphs (17) through (21).

(c) Failure by a system in any month to achieve treatment credit by meeting criteria in paragraphs (17) through (21) for microbial toolbox options that is at least equal to the level of treatment required in subparagraph (a) of this section is a violation of the treatment technique requirement.

(d) If the State determines during a sanitary survey or an equivalent source water assessment that after a system completed the monitoring conducted under paragraph (2)(a) or (b), significant changes occurred in the system's watershed that could lead to increased contamination of the source water by *Cryptosporidium,* the system must take actions specified by the State to address the contamination. These actions may include additional source water monitoring and/or implementing microbial toolbox options listed in paragraph (16).

(13) Unfiltered system *Cryptosporidium* treatment requirements.

(a) Determination of mean *Cryptosporidium* level.

1. Following completion of the initial source water monitoring required under paragraph (2)(a), unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under paragraph (2)(a). Systems must report this value to the State for approval no later than 6 months after the month the system is required to complete initial source water monitoring based on the schedule in paragraph (2)(c).

2. Following completion of the second round of source water monitoring required under paragraph (2)(b), unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under paragraph (2)(b). Systems must report this value to the State for approval no later than 6 months after the month the system is required to complete the second round of source water monitoring based on the schedule in paragraph (2)(c).

3. If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the calculation of the mean *Cryptosporidium* level in subparagraphs (a)1 or 2 of this paragraph.

4. The report to the State of the mean *Cryptosporidium* levels calculated under subparagraphs (a)1 and 2 of this paragraph must include a summary of the source water monitoring data used for the calculation.

5. Failure to comply with the conditions of subparagraph (a) of this paragraph is a violation of the treatment technique requirement.

(b) *Cryptosporidium* inactivation requirements. Unfiltered systems must provide the level of inactivation for *Cryptosporidium* specified in this paragraph, based on their mean *Cryptosporidium* levels as determined under subparagraph (a) of this paragraph and according to the schedule in paragraph (14).

1. Unfiltered systems with a mean *Cryptosporidium* level of 0.01 oocysts/L or less must provide at least 2-log *Cryptosporidium* inactivation.

2. Unfiltered systems with a mean *Cryptosporidium* level of greater than 0.01 oocysts/L must provide at least 3-log *Cryptosporidium* inactivation

(c) Inactivation treatment technology requirements. Unfiltered systems must use chlorine dioxide, ozone, or UV as described in paragraph (21) to meet the *Cryptosporidium* inactivation requirements of this section.

1. Systems that use chlorine dioxide or ozone and fail to achieve the *Cryptosporidium* inactivation required in subparagraph (b) of this paragraph on more than one day in the calendar month are in violation of the treatment technique requirement.

2. Systems that use UV light and fail to achieve the *Cryptosporidium* inactivation required in subparagraph (b) of this paragraph by meeting the criteria in paragraph(21)(d)3(ii) are in violation of the treatment technique requirement.

(d) Use of two disinfectants. Unfiltered systems must meet the combined *Cryptosporidium* inactivation requirements of this section and *Giardia lamblia* and virus inactivation requirements of 1200-5-1-.31 using a minimum of two disinfectants, and each of two disinfectants must separately achieve the total inactivation required for either *Cryptosporidium, Giardia lamblia,* or viruses.

(14) Schedule for compliance with *Cryptosporidium* treatment requirements.

(a) Following initial bin classification under paragraph (11)(c), filtered systems must provide the level of treatment for *Cryptosporidium* required under paragraph (12) according to the schedule in subparagraph (c) of this paragraph.

(b) Following initial determination of the mean *Cryptosporidium* level under paragraph (13)(a)(1), unfiltered systems must provide the level of treatment for *Cryptosporidium* required under paragraph (13) according to the schedule in subparagraph (c) of this paragraph.

(c) *Cryptosporidium* treatment compliance dates.

CRYPTOSPORIDIUM TREATMENT COMPLIANCE DATES TABLE

	Must comply with Systems that serve Cryptosporidium treatment requirements no later than [a]
(1) At least 100,000	(i) April 1, 2012
(2) From 50,000 to 99,999 people	(i) October 1, 2012
(3) From 10,000 to 49,999 people	(i) October 1, 2013
(4). Fewer than 10,000 people	(i) October 1, 2014

[a] States may allow up to an additional two years for complying with the treatment requirement for systems making capital improvements

(d) If the bin classification for a filtered system changes following the second round of source water monitoring, as determined under paragraph (11)(d), the system must provide the level of treatment for *Cryptosporidium* required under paragraph (12) on a schedule the State approves.

(e) If the mean *Cryptosporidium* level for an unfiltered system changes following the second round of monitoring, as determined under paragraph (13)(a)2, and if the system must provide a different level of *Cryptosporidium* treatment under paragraph (13) due to this change, the system must meet this treatment requirement on a schedule the State approves.

(15) Requirements for uncovered finished water storage facilities.

(a) Systems using uncovered finished water storage facilities must comply with the conditions of this paragraph.

(b) Systems must notify the State of the use of each uncovered finished water storage facility no later than April 1, 2008.

(c) Systems must meet the conditions of subparagraphs (c)1 or 2 of this paragraph for each uncovered finished water storage facility or be in compliance with a State-approved schedule to meet these conditions no later than April 1, 2009.

1. Systems must cover any uncovered finished water storage facility.

2. Systems must treat the discharge from the uncovered finished water storage facility to the distribution system to achieve inactivation and/or *Cryptosporidium* using a protocol approved by the State.

(d) Failure to comply with the requirements of this section is a violation of the treatment technique requirement.

(16) Microbial toolbox options for meeting *Cryptosporidium* treatment requirements.

(a) 1. Systems receive the treatment credits listed in the table in subparagraph (b) of this paragraph by meeting the conditions for microbial toolbox options described in paragraphs (17) through (21). Systems apply these treatment credits to meet the treatment requirements in paragraphs (12) or (13), as applicable.

2. Unfiltered systems are eligible for treatment credits for the microbial toolbox options described in paragraph (21) only.

(b) The following table summarizes options in the microbial toolbox:

MICROBIAL TOOLBOX SUMMARY TABLE: OPTIONS, TREATMENT CREDITS AND CRITERIA

Toolbox Option	*Cryptosporidium* treatment credit with design and implementation criteria
Source Protection and Management Toolbox Options	
(1) Watershed control program .	0.5-log credit for State-approved program comprising required elements, annual program status report to State, and regular watershed survey. Unfiltered systems are not eligible for credit. Specific criteria are in 1200-5-1-.39(17)(a).
(2) Alternative source/intake management	No prescribed credit. Systems may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria are in 1200-5-1-.39(17)(b)
Pre Filtration Toolbox Options	
(3) Presedimentation basin with coagulation.	0.5-log credit during any month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative State-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through basins. Specific criteria are in 1200-5-1-.39(18)(a).
(4) Two-stage lime softening	0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow must pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria are in 1200-5-1-.39(18)(b).
(5) Bank filtration	0.5-log credit for 25-foot setback; 1.0-log credit for 50-foot setback; aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU. Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit. Specific criteria are in 1200-5-1-.39(18)(c).
Treatment Performance Toolbox Options	
(6) Combined filter performance	0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria are in 1200-5-1-.39(19)(a).
(7) Individual filter performance	0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria are in 1200-5-1-.39(19)(b).
(8) Demonstration of performance.....	Credit awarded to unit process or treatment train based on a demonstration to the State with a State- approved protocol. Specific criteria are in 1200-5-1-.39(19)(c).
Additional Filtration Toolbox Options	
(9) Bag or cartridge filters (individual filters)	Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety. Specific criteria are in 1200-5-1-.39(20)(a).
(10) Bag or cartridge filters (in series)	Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria are in 1200-5-1-.39(20)(a).
(11) Membrane filtration	Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria are in 1200-5-1-.39(20)(b).
(12) Second stage filtration	0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation prior to first filter. Specific criteria are in 1200-5-1-.39(20)(c)
(13) Slow sand filters	2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria are in 1200-5-1-.39(20)(d).
Inactivation Toolbox Options	
(14) Chlorine dioxide	Log credit based on measured CT in relation to CT table. Specific criteria in 1200-5-1-.39(21)(b)
(15) Ozone	Log credit based on measured CT in relation to CT table. Specific criteria in 1200-5-1-.39(21(b)
(16) UV	Log credit based on validated UV dose relation to UV dose table; reactor validation testing required to establish UV dose and associated operating conditions. Specific criteria in 1200-5-1-.39(21)(d).

(17) Source toolbox components.

(a) Watershed control program. Systems receive 0.5-log *Cryptosporidium* treatment credit for implementing a watershed control program that meets the requirements of this section.

1. Systems that intend to apply for the watershed control program credit must notify the State of this intent no later than two years prior to the treatment compliance date applicable to the system in paragraph (14).

2. Systems must submit to the State a proposed watershed control plan no later than one year before the applicable treatment compliance date in paragraph 14.. The State must approve the watershed control plan for the system to receive watershed control program treatment credit. The watershed control plan must include the elements in subparagraphs (a)2(i) through (iv) of this paragraph.

   (i) Identification of an ''area of influence'' outside of which the likelihood of *Cryptosporidium* or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys under subparagraph (a)5(ii) of this section.

   (ii) Identification of both potential and actual sources of *Cryptosporidium* contamination and an assessment of the relative impact of these sources on the system's source water quality.

   (iii) An analysis of the effectiveness and feasibility of control measures that could reduce *Cryptosporidium* loading from sources of contamination to the system's source water.

   (iv) A statement of goals and specific actions the system will undertake to reduce source water *Cryptosporidium* levels. The plan must explain how the actions are expected to contribute to specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.

3. Systems with existing watershed control programs (*i.e.,* programs in place on January 5, 2006) are eligible to seek this credit. Their watershed control plans must meet the criteria in subparagraph (a)2 of this paragraph and must specify ongoing and future actions that will reduce source water *Cryptosporidium* levels.

4. If the State does not respond to a system regarding approval of a watershed control plan submitted under this section and the system meets the other requirements of this section, the watershed control program will be considered approved and 0.5 log *Cryptosporidium* treatment credit will be awarded unless and until the State subsequently withdraws such approval.

5. Systems must complete the actions in subparagraphs (a)5(i) through (iii) of this paragraph to maintain the 0.5-log credit.

   (i) Submit an annual watershed control program status report to the State. The annual watershed control program status report must describe the system's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the State or as the result of the watershed survey conducted under paragraph (a)5(ii) of this paragraph. It must also describe any significant changes that have occurred in the watershed since the last watershed sanitary survey. If a system determines during implementation that making a significant change to its approved watershed control program is necessary, the system must notify the State prior to making any such changes. If any change is likely to reduce the level of source water protection, the system must also list in its notification the actions the system will take to mitigate this effect.

(ii) Undergo a watershed sanitary survey every three years for community water systems and every five years for noncommunity water systems and submit the survey report to the State. The survey must be conducted according to State guidelines and by persons the State approves.

(I) The watershed sanitary survey must meet the following criteria: encompass the region identified in the State-approved watershed control plan as the area of influence; assess the implementation of actions to reduce source water *Cryptosporidium* levels; and identify any significant new sources of *Cryptosporidium.*

(II) If the State determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, systems must undergo another watershed sanitary survey by a date the State requires, which may be earlier than the regular date in paragraph (a)5(ii) of this paragraph.

(iii) The system must make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon request. These documents must be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The State may approve systems to withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.

6. If the State determines that a system is not carrying out the approved watershed control plan, the State may withdraw the watershed control program treatment credit.

(b) Alternative source.

1. A system may conduct source water monitoring that reflects a different intake location (either in the same source or for an alternate source) or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the State approves, a system may determine its bin classification under paragraph (11) based on the alternative source monitoring results.

2. If systems conduct alternative source monitoring under subparagraph (b)1 of this paragraph, systems must also monitor their current plant intake concurrently as described in paragraph (2).

3. Alternative source monitoring under subparagraph (b)1 of this paragraph must meet the requirements for source monitoring to determine bin classification, as described in paragraphs (2) through (7). Systems must report the alternative source monitoring results to the State, along with supporting information documenting the operating conditions under which the samples were collected.

4. If a system determines its bin classification under paragraph (11) using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the system must relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in paragraph (14).

(18) Pre-filtration treatment toolbox components.

(a) Presedimentation. Systems receive 0.5-log *Cryptosporidium* treatment credit for a presedimentation basin during any month the process meets the criteria in this paragraph.

1. The presedimentation basin must be in continuous operation and must treat the entire plant flow taken from a surface water or GWUDI source.

2. The system must continuously add a coagulant to the presedimentation basin.

3. The presedimentation basin must achieve the performance criteria in part 3(i) or (ii) of this paragraph

   (i) Demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent and must be calculated as follows: $\log_{10}$(monthly mean of daily influent turbidity) minus $\log_{10}$(monthly mean of daily effluent turbidity).

   (ii) Complies with State-approved performance criteria that demonstrate at least 0.5-log mean removal of micron-sized particulate material through the presedimentation process.

(b) Two-stage lime softening. Systems receive an additional 0.5-log *Cryptosporidium* treatment credit for a two-stage lime softening plant if chemical addition and hardness precipitation occur in two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or GWUDI source.

(c) Bank filtration. Systems receive *Cryptosporidium* treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this subparagraph. Systems using bank filtration when they begin source water monitoring under paragraph (2)(a) must collect samples as described in paragraph (4)(d) and are not eligible for this credit.

1. Wells with a ground water flow path of at least 25 feet receive 0.5-log treatment credit; wells with a ground water flow path of at least 50 feet receive 1.0-log treatment credit. The ground water flow path must be determined as specified in subparagraph (c)4 of this paragraph.

2. Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. A system must characterize the aquifer at the well site to determine aquifer properties. Systems must extract a core from the aquifer and demonstrate that in at least 90 percent of the core length, grains less than 1.0 mm in diameter constitute at least 10 percent of the core material.

3. Only horizontal and vertical wells are eligible for treatment credit.

4. For vertical wells, the ground water flow path is the measured distance from the edge of the surface water body under high flow conditions (determined by the 100 year floodplain elevation boundary or by the floodway, as defined in Federal Emergency Management Agency flood hazard maps) to the well screen. For horizontal wells, the ground water flow path is the measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral screen.

5. Systems must monitor each wellhead for turbidity at least once every four hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the system must report this result to the State and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the State determines that microbial removal has been compromised, the State may revoke treatment credit until the system implements corrective actions approved by the State to remediate the problem.

6. Springs and infiltration galleries are not eligible for treatment credit under this section, but are eligible for credit under paragraph (19)(c).

7. Bank filtration demonstration of performance. The State may approve *Cryptosporidium* treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this subparagraph. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in subparagraphs (c)1 through 5 of this paragraph.

   (i) The study must follow a State-approved protocol and must involve the collection of data on the removal of *Cryptosporidium* or a surrogate for *Cryptosporidium* and related hydrogeologic and water quality parameters during the full range of operating conditions.

   (ii) The study must include sampling both from the production well(s) and from monitoring wells that are screened and located along the shortest flow path between the surface water source and the production well(s).

(19) Treatment performance toolbox components.

(a) Combined filter performance. Systems using conventional filtration treatment or direct filtration treatment receive an additional 0.5-log *Cryptosporidium* treatment credit during any month the system meets the criteria in this paragraph. Combined filter effluent (CFE) turbidity must be less than or equal to 0.15 NTU in at least 95 percent of the measurements. Turbidity must be measured as described in 1200-5-1-.31.

(b) Individual filter performance. Systems using conventional filtration treatment or direct filtration treatment receive 0.5-log *Cryptosporidium* treatment credit, which can be in addition to the 0.5-log credit under subparagraph (a) of this paragraph, during any month the system meets the criteria in this subparagraph. Compliance with these criteria must be based on individual filter turbidity monitoring as described in 1200-5-1-,31, as applicable.

1. The filtered water turbidity for each individual filter must be less than or equal to 0.15 NTU in at least 95 percent of the measurements recorded each month.

2. No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.

3. Any system that has received treatment credit for individual filter performance and fails to meet the requirements of subparagraphs (b)1 or 2 of this paragraph during any month does not receive a treatment technique violation under paragraph (12)(c) if the State determines the following:

   (i) The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance.

   (ii) The system has experienced no more than two such failures in any calendar year.

(c) Demonstration of performance. The State may approve *Cryptosporidium* treatment credit for drinking water treatment processes based on a demonstration of performance study that meets the criteria in this subparagraph. This treatment credit may be greater than or less than the prescribed treatment credits in paragraph (12) or paragraphs (18) through (21) and may be awarded to treatment processes that do not meet the criteria for the prescribed credits.

1. Systems cannot receive the prescribed treatment credit for any toolbox box option in paragraphs (18) through (21) if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under this subparagraph.

2. The demonstration of performance study must follow a State-approved protocol and must demonstrate the level of *Cryptosporidium* reduction the treatment process will achieve under the full range of expected operating conditions for the system.

3. Approval by the State must be in writing and may include monitoring and treatment performance criteria that the system must demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The State may designate such criteria where necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

(20) Additional filtration toolbox components.

(a) Bag and cartridge filters. Systems receive *Cryptosporidium* treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series by meeting the criteria in subparagraphs (a)1 through 10 of this paragraph. To be eligible for this credit, systems must report the results of challenge testing that meets the requirements of subparagraphs (a)2 through 9 of this paragraph to the State. The filters must treat the entire plant flow taken from a subpart H source.

1. The *Cryptosporidium* treatment credit awarded to bag or cartridge filters must be based on the removal efficiency demonstrated during challenge testing that is conducted according to the criteria in subparagraphs (a)2 through (a)9 of this paragraph. A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series must be applied to challenge testing results to determine removal credit. Systems may use results from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria specified in subparagraphs (a)2 through 9 of this paragraph.

2. Challenge testing must be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the system will use for removal of *Cryptosporidium.* Bag or cartridge filters must be challenge tested in the same configuration that the system will use, either as individual filters or as a series configuration of filters.

3. Challenge testing must be conducted using *Cryptosporidium* or a surrogate that is removed no more efficiently than *Cryptosporidium.* The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discreetly quantifying the specific microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.

4. The maximum feed water concentration that can be used during a challenge test must be based on the detection limit of the challenge particulate in the filtrate (i.e., filtrate detection limit) and must be calculated using the following equation:

$$\text{Maximum Feed Concentration} = 1 \times 10^{4} \times (\text{Filtrate Detection Limit})$$

5. Challenge testing must be conducted at the maximum design flow rate for the filter as specified by the manufacturer.

6. Each filter evaluated must be tested for a duration sufficient to reach 100 percent of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of this subpart.

7. Removal efficiency of a filter must be determined from the results of the challenge test and expressed in terms of log removal values using the following equation:

$$LRV = LOG_{10}(C_f)-LOG_{10}(C_p)$$

Where:

LRV = log removal value demonstrated during challenge testing; C_f = the feed concentration measured during the challenge test; and Cp = the filtrate concentration measured during the challenge test. In applying this equation, the same units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, then the term Cp must be set equal to the detection limit.

8. Each filter tested must be challenged with the challenge particulate during three periods over the filtration cycle: within two hours of start-up of a new filter; when the pressure drop is between 45 and 55 percent of the terminal pressure drop; and at the end of the cycle after the pressure drop has reached 100 percent of the terminal pressure drop. An LRV must be calculated for each of these challenge periods for each filter tested. The LRV for the filter (LRV_{filter}) must be assigned the value of the minimum LRV observed during the three challenge periods for that filter.

9. If fewer than 20 filters are tested, the overall removal efficiency for the filter product line must be set equal to the lowest LRV_{filter} among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line must be set equal to the 10th percentile of the set of LRV_{filter} values for the various filters tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

10. If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted to the State.

(b) Membrane filtration.

1. Systems receive *Cryptosporidium* treatment credit for membrane filtration that meets the criteria of this subparagraph. Membrane cartridge filters that meet the definition of membrane filtration in 1200-5-1-.04 are eligible for this credit. The level of treatment credit a system receives is equal to the lower of the values determined under subparagraph (b)1(i) and (ii) of this paragraph.

   (i) The removal efficiency demonstrated during challenge testing conducted under the conditions in subparagraph (b)2 of this paragraph.

   (ii) The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in subparagraph (b)3 of this paragraph.

2. Challenge Testing. The membrane used by the system must undergo challenge testing to evaluate removal efficiency, and the system must report the results of challenge testing to the State. Challenge testing must be conducted according to the criteria in subparagraphs (b)2(i) through (vii) of this paragraph. Systems may use data from challenge testing

conducted prior to January 5, 2006, if the prior testing was consistent with the criteria in subparagraphs (b)2(i) through (vii) of this paragraph.

(i) Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

(ii) Challenge testing must be conducted using *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.

(iii) The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation: Maximum Feed Concentration = $3.16 \times 10^6 \times$ (Filtrate Detection Limit)

(iv) Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric percent of feed water that is converted to filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process (*i.e.*, backwashing).

(v) Removal efficiency of a membrane module must be calculated from the challenge test results and expressed as a log removal value according to the following equation: $LRV = LOG_{10}(C_f) \times LOG_{10}(C_p)$

Where:

LRV = log removal value demonstrated during the challenge test; C_f = the feed concentration measured during the challenge test; and C_p = the filtrate concentration measured during the challenge test. Equivalent units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, the term C_p is set equal to the detection limit for the purpose of calculating the LRV. An LRV must be calculated for each membrane module evaluated during the challenge test.

(vi) The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ($LRV_{C\text{-}Test}$). If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then LRVC-Test is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(vii) The challenge test must establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the *Cryptosporidium* removal capability of the membrane filtration module. This performance test must be applied

to each production membrane module used by the system that was not directly challenge tested in order to verify *Cryptosporidium* removal capability. Production modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.

(viii) If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the State.

3. Direct integrity testing. Systems must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in subparagraphs (b)3(i) through (vi) of this paragraph. A direct integrity test is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (*i.e.*, one or more leaks that could result in contamination of the filtrate).

(i) The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

(ii) The direct integrity method must have a resolution of 3 micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.

(iii) The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the State, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the approach in either subparagraph (b)3(iii)(I) or (II) of this paragraph as applicable to the type of direct integrity test the system uses.

(I) For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation: $LRVDIT = LOG_{10} (Q_p /(VCF \times Q_{breach}))$ Where: LRVDIT = the sensitivity of the direct integrity test; Q_p = total design filtrate flow from the membrane unit; Q_{breach} = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured, and VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

(II) For direct integrity tests that use a particulate or molecular marker, the direct integrity test sensitivity must be calculated according to the following equation:

$$LRV_{DIT} = LOG_{10}(C_f)\text{-}LOG_{10}(C_p)$$

Where:
LRVDIT = the sensitivity of the direct integrity test; C_f = the typical feed concentration of the marker used in the test; and C_p = the filtrate concentration of the marker from an integral membrane unit.

(iv) Systems must establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the State.

(v) If the result of a direct integrity test exceeds the control limit established under subparagraph (b)3.(iv) of this paragraph, the system must remove the membrane unit from service. Systems must conduct a direct integrity test to verify any repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.

(vi) Systems must conduct direct integrity testing on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation. The State may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium*, or reliable process safeguards.

4. Indirect integrity monitoring. Systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in subparagraphs (b)4(i) through (v) of this paragraph. Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in subparagraphs (b)3(i) through (vi) of this paragraph is not subject to the requirements for continuous indirect integrity monitoring. Systems must submit a monthly report to the State summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.

(i) Unless the State approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.

(ii) Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.

(iii) Continuous monitoring must be separately conducted on each membrane unit.

(iv) If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (i.e., two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit as specified in subparagraphs (b)3(i) through (vi) of this paragraph.

(v) If indirect integrity monitoring includes a State-approved alternative parameter and if the alternative parameter exceeds a State-approved control limit for a period greater than 15 minutes, direct integrity testing must immediately be performed on the associated membrane units as specified in subparagraphs (b)3(i) through (vi) of this paragraph.

(c) Second stage filtration. Systems receive 0.5-log *Cryptosporidium* treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC, or other fine grain media following granular media filtration if the State approves. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat the entire plant flow taken from a surface water or GWUDI source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The State must approve the treatment credit based on an assessment of the design characteristics of the filtration process.

(d) Slow sand filtration (as secondary filter). Systems are eligible to receive 2.5-log *Cryptosporidium* treatment credit for a slow sand filtration process that follows a separate

stage of filtration if both filtration stages treat entire plant flow taken from a surface water or GWUDI source and no disinfectant residual is present in the influent water to the slow sand filtration process. The State must approve the treatment credit based on an assessment of the design characteristics of the filtration process. This subparagraph does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.

(21) Inactivation toolbox components.

(a) Calculation of CT values.

1. CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems with treatment credit for chlorine dioxide or ozone under subparagraph (b) or (c) of this paragraph must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in 1200-5-1-.31.

2. Systems with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, systems must add the *Cryptosporidium* CT values in each segment to determine the total CT for the treatment plant.

(b) CT values for chlorine dioxide and ozone.

1. Systems receive the *Cryptosporidium* treatment credit listed in this table by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in subparagraph (a) of this paragraph.

CT VALUES (MG·MIN/L) FOR *Cryptosporidium* INACTIVATION BY CHLORINE DIOXIDE [1]

	Water Temperature in °C										
Log Credit	<=0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25……..	159	153	140	128	107	90	69	45	29	19	12
(ii) 0.5	319	305	279	256	214	180	138	89	58	38	24
(iii) 1.0 .....…	637	610	558	511	429	360	277	179	116	75	49
(iv) 1.5……..	956	915	838	767	643	539	415	268	174	113	73
(v) 2.0…….	1275	1220	1117	1023	858	719	553	357	232	150	98
(vi) 2.5……	1594	1525	1396	1278	1072	899	691	447	289	188	122
(vii) 3.0……	1912	1830	1675	1534	1286	1079	830	536	347	226	147

[1] Systems may use this equation to determine log credit between the indicated values: Log credit = $(0.001506 \times (1.09116)^{Temp}) \times CT$.

2. Systems receive the *Cryptosporidium* treatment credit listed in this table by meeting the corresponding ozone CT values for the applicable water temperature, as described in subparagraph (a) of this paragraph.

CT VALUES (MG·MIN/L) FOR *Cryptosporidium* INACTIVATION BY OZONE [1]

	Water Temperature in °C										
Log Credit	<=0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25……..	6.0	5.8	5.2	4.8	4.0	3.3	2.5	1.6	1.0	0.6	0.39
(ii) 0.5	12	12	10	9.5	7.9	6.5	4.9	3.1	2.0	1.2	0.78
(iii) 1.0 .....…	24	23	21	19	16	13	9.9	6.2	3.9	2.5	1.6
(iv) 1.5……..	36	35	31	29	24	20	15	9.3	5.9	3.7	2.4
(v) 2.0…….	48	46	42	38	32	26	20	12	7.8	4.9	3.1
(vi) 2.5……	60	58	52	48	40	33	25	16	9.8	6.2	3.9
(vii) 3.0……	72	69	63	57	47	39	30	19	12	7.4	4.7

[1] Systems may use this equation to determine log credit between the indicated values: Log credit = $(0.0397 \times (1.09757)^{Temp}) \times CT$.

(c) Site-specific study. The State may approve alternate chlorine dioxide or ozone CT values to those listed in subparagraph (b) of this paragraph on a site-specific basis. The state must base this approval on a site-specific study a system conducts that follows a State approved protocol.

(d) Ultraviolet light. Systems receive *Cryptosporidium, Giardia lamblia,* and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in subparagraph (d)1 of this paragraph. Systems must validate and monitor UV reactors as described in subparagraphs (d)2 and 3 of this paragraph to demonstrate that they are achieving a particular UV dose value for treatment credit.

1. The treatment credits listed in this table are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, systems must demonstrate an equivalent germicidal dose through reactor validation testing, as described in subparagraph (d)2. The UV dose values of this table are applicable only to post-filter applications of UV in filtered systems and to unfiltered systems.

UV DOSE TABLE FOR *Cryptosporidium, Giardia lamblia,* AND VIRUS INACTIVATION CREDIT

Log Credit	*Cryptosporidium* UV dose (mJ/cm^2)	*Giardia lamblia* UV dose (mJ/cm^2)	Virus UV dose (mJ/cm^2)
(i) 0.5 .	1.6	1.5	39
(ii) 1.0	2.5	2.1	58
(iii) 1.5	3.9	3.0	79
(iv) 2.0	5.8	5.2	100
(v) 2.5	8.5	7.7	121
(vi) 3.0	12	11	143
(vii) 3.5	15	15	163
(viii) 4.0	22	22	186

2. Reactor validation testing. Systems must use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in subparagraph (d)1 of this paragraph (*i.e.*, validated operating conditions). These operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status.

(i) When determining validated operating conditions, systems must account for the following factors: UV absorbance of the water; lamp fouling and aging; measurement uncertainty of on-line sensors; UV dose distributions arising from the velocity profiles through the reactor; failure of UV lamps or other critical system components; and inlet and outlet piping or channel configurations of the UV reactor.

(ii) Validation testing must include the following: Full scale testing of a reactor that conforms uniformly to the UV reactors used by the system and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

(iii) The State may approve an alternative approach to validation testing.

3. Reactor monitoring.

(i) Systems must monitor their UV reactors to determine if the reactors are operating within validated conditions, as determined under subparagraph (d)2 of this paragraph. This monitoring must include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the State designates based on UV reactor operation.

Systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol the State approves.

(ii) To receive treatment credit for UV light, systems must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in subparagraphs (d)1 and 2 of this paragraph. Systems must demonstrate compliance with this condition by the monitoring required under subparagraph (d)3(i) of this paragraph.

(22) Reporting requirements.

(a) Systems must report sampling schedules under paragraph (3) and source water monitoring results under paragraph (7) unless they notify the State that they will not conduct source water monitoring due to meeting the criteria of paragraph (2)(d).

(b) Systems must report the use of uncovered finished water storage facilities to the State as described in paragraph (5).

(c) Filtered systems must report their *Cryptosporidium* bin classification as described in paragraph (11).

(d) Unfiltered systems must report their mean source water *Cryptosporidium* level as described in paragraph (13).

(e) Systems must report disinfection profiles and benchmarks to the State as described in paragraphs (9) through (10) prior to making a significant change in disinfection practice.

(f) Systems must report to the State in accordance with the following table for any microbial toolbox options used to comply with treatment requirements under paragraphs (12) or (13). Alternatively, the State may approve a system to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.

MICROBIAL TOOLBOX REPORTING REQUIREMENTS

Toolbox option	Systems must submit the following information	On the following schedule
(1) Watershed control program (WCP).	(i) Notice of intention to develop a new or continue an existing watershed control program.	No later than two years before the applicable treatment compliance date in paragraph (14).
	(ii) Watershed control plan .	No later than one year before the applicable treatment compliance date in paragraph (14).
	(iii) Annual watershed control program status report.	Every 12 months, beginning one year after the applicable treatment compliance date in paragraph (14).
	(iv) Watershed sanitary survey report	For community water systems, every three years beginning three years after the applicable treatment compliance date in paragraph (14). For noncommunity water systems, every five years beginning five years after the applicable treatment compliance date in paragraph (14)
(2) Alternative source/intake management.	Verification that system has relocated the intake or adopted the intake withdrawal procedure reflected in monitoring results	No later than the applicable treatment compliance date in paragraph (14).
(3) Presedimentation	Monthly verification of the following: (i) Continuous basin operation (ii) Treatment of 100% of the flow (iii) Continuous addition of a coagulant (iv) At least 0.5-log mean reduction of influent turbidity or compliance with alternative State-approved performance criteria.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14)

(4) Two-stage lime softening	Monthly verification of the following: (i) Chemical addition and hardness precipitation occurred in two separate and sequential softening stages prior to filtration (ii) Both stages treated 100% of the plant flow.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).
(5) Bank filtration	(i) Initial demonstration of the following: (A) Unconsolidated, predominantly sandy aquifer (B) Setback distance of at least 25 ft. (0.5-log credit) or 50 ft. (1.0-log credit).	No later than the applicable treatment compliance date in paragraph (14).
	(ii) If monthly average of daily max turbidity is greater than 1 NTU then system must report result and submit an assessment of the cause..	Report within 30 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14)
(6) Combined filter performance.	Monthly verification of combined filter effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the 4 hour CFE measurements taken each month.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).
(7) Individual filter performance.	Monthly verification of the following: (i) Individual filter effluent (IFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter (ii) No individual filter greater than 0.3 NTU in two consecutive readings 15 minutes apart	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14)
(8) Demonstration of performance.	(i) Results from testing following a State approved protocol. (ii) As required by the State, monthly verification of operation within conditions of State approval for demonstration of performance credit.	No later than the applicable treatment compliance date in paragraph (14). Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).
(9) Bag filters and cartridge	(i) Demonstration that the following criteria are met: (A) filters. Process meets the definition of bag or cartridge filtration; (B) Removal efficiency established through challenge testing that meets criteria in this subpart. (ii) Monthly verification that 100% of plant flow was filtered.	No later than the applicable treatment compliance date in paragraph (14). Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).
(10) Membrane filtration	(i) Results of verification testing demonstrating the following: (A) Removal efficiency established through challenge testing that meets criteria in this subpart; (B) Integrity test method and parameters, including resolution, sensitivity, test frequency, control limits, and associated baseline. (ii) Monthly report summarizing the following: (A) All direct integrity tests above the control limit; (B) If applicable, any turbidity or alternative state-approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken.	No later than the applicable treatment compliance date in paragraph (14). Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).
(11) Second stage filtration	Monthly verification that 100% of flow was filtered through both stages and that first stage was preceded by coagulation step	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).
12) Slow sand filtration (as secondary filter)	Monthly verification that both a slow sand filter and a preceding separate stage of filtration treated 100% of flow from subpart H sources.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).

(13) Chlorine dioxide	Summary of CT values for each day as described in paragraph (21).	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).
(14) Ozone	Summary of CT values for each day as described in paragraph (21).	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).
(15) UV	(i) Validation test results demonstrating operating conditions that achieve required UV dose. (ii) Monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose as specified in paragraph (21)(d).	No later than the applicable treatment compliance date in paragraph (14). Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in paragraph (14).

(23) Recordkeeping requirements.

(a) Systems must keep results from the initial round of source water monitoring under paragraph (2)(a) and the second round of source water monitoring under paragraph (2)(b) until 3 years after bin classification under paragraph (11) for filtered systems or determination of the mean *Cryptosporidium* level under paragraph (11) for unfiltered systems for the particular round of monitoring.

(b) Systems must keep any notification to the State that they will not conduct source water monitoring due to meeting the criteria of paragraph (2)(d) for 3 years.

(c) Systems must keep the results of treatment monitoring associated with microbial toolbox options under paragraphs (17) through (21) and with uncovered finished water reservoirs under paragraph (15), as applicable, for 3 years.

(24) Requirements to respond to significant deficiencies identified in sanitary surveys performed by the state or EPA.

(a) A sanitary survey is an onsite review of the water source (identifying sources of contamination by using results of source water assessments where available), facilities, equipment, operation, maintenance, and monitoring compliance of a PWS to evaluate the adequacy of the PWS, its sources and operations, and the distribution of safe drinking water.

(b) For the purposes of this section, a significant deficiency includes a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that EPA determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.

(c) For sanitary surveys performed by the state or EPA, systems must respond in writing to significant deficiencies identified in sanitary survey reports no later than 45 days after receipt of the report, indicating how and on what schedule the system will address significant deficiencies noted in the survey.

(d) Systems must correct significant deficiencies identified in sanitary survey reports according to the schedule approved by the state or EPA, or if there is no approved schedule, according to the schedule reported under subparagraph (c) of this paragraph if such deficiencies are within the control of the system.

Rulemaking Authority: T.C.A. Sections 68-221-704 and T.C.A. Section 4-5-202
Substantive Authority: T.C.A. Sections 68-221-701 et. seq.

The Rulemaking Hearing Rules set out herein were properly filed in the Department of State on the 31st day of July, 2006, and will become effective on the 14th day of October, 2006.