DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

Water Quality Control Commission

REGULATION NO. 11 - COLORADO PRIMARY DRINKING WATER

5 CCR 1002-11

[Editor's Notes follow the text of the rules at the end of this CCR Document.]

11.1 AUTHORITY AND PURPOSE

11.1(1) Authority

The Water Quality Control Commission has promulgated the *Colorado Primary Drinking Water Regulations* pursuant to sections 24-4-104, 24-4-105, 25-1.5-101, 25-1.5 Part 2, 25-1-109, 25-1-114, 25-1-114.1, and 25-8-202, Colorado Revised Statutes.

11.1(2) Purpose

The purpose of the *Colorado Primary Drinking Water Regulations* is to assure the safety of public drinking water supplies and to enable the state of Colorado to assume responsibility for enforcing the standards established by the federal Safe Drinking Water Act (i.e., Public Law 93-523), as amended.

11.1(3) RESERVED

11.1(4) Severability Clause

The provisions of these regulations are severable. If any regulation, rule, section, paragraph, or other portion of the *Colorado Primary Drinking Water Regulations* is, for any reason, held inoperative, unconstitutional, void or invalid, the validity of the remaining portions shall not be affected.

11.1(5) Applicability

(a) The *Colorado Primary Drinking Water Regulations* apply to each public water system, unless the public water system meets all of the following conditions:

(i) Consists only of distribution facilities and/or storage facilities.

(ii) Does not have any collection facilities.

(iii) Does not have any treatment facilities.

(iv) Obtains all of its water from a public water system to which these regulations apply.

(v) Is not owned or operated by a public water system to which these regulations apply.

(vi) Does not sell water to any person.

(vii) Is not a carrier which conveys passengers in interstate commerce.

(b) The Department, regardless of any other provisions of the *Colorado Primary Drinking Water Regulations* , must enforce the *Colorado Primary Drinking Water Regulations* against federal

facilities, on federally owned lands within the State, excluding Native American Lands.

11.1(6) General Authorities

(a) Testing and Monitoring Requirements

(i) To demonstrate compliance with the *Colorado Primary Drinking Water Regulations* or terms and conditions of enforcement orders, the Department may require the supplier to conduct tests and monitoring as the Department determines is necessary to protect public health.

(A) These tests must be conducted using methods approved by the Department.

(ii) The Department may require the supplier to install, maintain, and use instrumentation to monitor and record data.

(A) The supplier must submit periodic reports on a continuing basis to demonstrate compliance with applicable regulations.

(b) Entry and Inspection of Public Water Systems

(i) Upon presentation of proper credentials, authorized representatives of the Department may enter and inspect, at any reasonable time and in a reasonable manner, any establishment, facility, or any other property, premises, or place owned, operated or under the control of a public water system or other person for the purpose of investigating any actual, suspected, or potential violations of any minimum general sanitary standards required by section 25-1.5-202, Colorado Revised Statutes.

(ii) During entry, authorized representatives may collect drinking water samples.

(A) Any sample collected may be used as evidence in an enforcement action.

(B) A split or duplicate sample shall be offered to the supplier.

(C) The supplier shall be promptly provided a copy of the sample results.

(iii) If entry or inspection is denied or not consented to by the supplier, the Department has the authority to obtain a warrant to enter and inspect said property, premises, or place and shall obtain the warrant from the district or county court for the judicial district or county in which the property, premises, or place is located.

(A) The district and county courts of the state have the authority to issue a warrant if the Department shows the need for the entry and inspection.

(B) A copy of the inspection report(s) must be provided to the court within a reasonable time after the inspection.

(c) Enforcement Authority

(i) If the supplier violates any provision of the *Colorado Primary Drinking Water Regulations* , the Department may issue an enforcement order requiring the supplier to take actions necessary to correct the violation(s). The Department may issue an enforcement order:

(A) Upon finding significant deviation from plans and specifications or significant inaccuracies in data submitted to the Department which the Department used as

the basis for approval of proposed construction or modifications to a public water system;

(B) Due to the incidence of disease, the source of which is reasonably identified by the Department as originating from the consumption of drinking water from a public water system;

(C) Upon determining that contaminants are present in a public water supply and that the presence of these contaminants presents an unreasonable risk to public health; or

(D) Upon determining that a physical condition or an operation or maintenance practice poses an unreasonable risk to public health.

(ii) An enforcement order may require the supplier to:

(A) Design, redesign, install, modify, construct or reconstruct facilities, which may include sources and treatment;

(B) Use treatment techniques;

(C) Acquire an alternative source;

(D) Take other corrective action(s); or

(E) Demonstrate the adequacy of control measures and use operational techniques and practices that will eliminate any violations.

(iii) A supplier that violates the *Colorado Primary Drinking Water Regulations* or an enforcement order(s) may be subject to civil or criminal actions pursuant to the provisions of sections 25-1-114 and 25-1-114.1, Colorado Revised Statutes.

(iv) The supplier may request a hearing to contest an enforcement order.

(A) Requests for a hearing must:

(I) Be filed in writing with the Department no later than 30 days after service of the enforcement order;

(II) State the grounds on which the enforcement order is contested; and

(III) State the amount of time the supplier estimates will be required for the hearing.

(B) The hearing regarding the enforcement order shall be held in accordance with applicable provisions of Article 4 of Title 24, Colorado Revised Statutes.

11.2 GENERAL REQUIREMENTS

11.2(1) Tampering

(a) "TAMPER" means to introduce a contaminant into a public water system or into drinking water or to otherwise interfere with drinking water or the operation of a public water system with the intention of harming people or public water systems. It does not include the standard accepted treatment procedures performed by the supplier in preparing water for human consumption.

(b) The supplier must notify the Department as soon as possible but no later than 10 a.m. of the next calendar day after any tampering, suspected tampering, or receipt of a tampering threat.

(c) The supplier must submit written notification to the Department no later than five calendar days after any tampering, suspected tampering, or receipt of a tampering threat explaining the circumstances of the occurrence and identifying the action(s) taken to ensure the ability of the supplier to provide a safe and reliable supply of drinking water and to prevent any reoccurrence.

11.2(2) Identification of Construction Materials

(a) For community water systems, the supplier must identify whether any of the following construction materials are present in the distribution system and report to the Department the existence of:

(i) Lead from piping, solder, caulking, interior lining of distribution mains, alloys, and home plumbing.

(ii) Copper from piping, alloys, service lines, and home plumbing.

(iii) Galvanized piping, service lines, and home plumbing.

(iv) Ferrous piping materials such as cast iron and steel.

(v) Asbestos cement pipe.

(b) For community water systems, the Department may require the supplier to identify and report the presence of other construction materials in the distribution system that may contribute contaminants to the drinking water (e.g., vinyl-lined asbestos cement pipe or coal tar-lined pipes and tanks).

11.2(3) Prohibition on the Use of Lead Pipes, Solder, and Flux

Any pipe, solder, or flux, which is used after June 19, 1986 in the installation or repair of any public water system, or any plumbing in residential or non-residential buildings providing water for human consumption that is connected to a public water system, must be lead free.

(a) This prohibition does not apply to leaded joints necessary for the repair of cast iron pipes.

11.2(4) Violations and Response for Monitoring and Sampling

(a) If the supplier fails to comply with any monitoring or sampling requirement of the *Colorado Primary Drinking Water Regulations* a monitoring violation occurs.

(b) In the event of a monitoring or sampling violation, the supplier must:

(i) Report the violation to the Department no later than 48 hours after the violation occurs.

(ii) Distribute Tier 3 public notice as specified in 11.33, unless otherwise specified.

11.2(5) Guidance Documents and Policy Documents

(a) The Department has developed guidance documents designed to assist suppliers with understanding the regulations and to explain the specific requirements the supplier must meet to maintain compliance.

(b) The Department has developed a number of internal policy documents designed to address special

primacy requirements, which are defined in 40 CFR 142, in order to maintain primary enforcement responsibility in the state of Colorado, and therefore are not included in these regulations.

(c) While not regulatory in nature, these policies and guidance are public record and copies of the available guidance and policy documents may be obtained by requesting them from the Department at:

Colorado Department of Public Health and Environment

Water Quality Control Division

4300 Cherry Creek Drive South

Denver, Colorado 80246-1530

(303) 692-3500

These documents may also be available on the Department's Internet website at the following address: www.colorado.gov/cdphe.

11.2(6) Materials Incorporated by Reference

(a) All materials incorporated by reference in the *Colorado Primary Drinking Water Regulations* include only those versions cited and not later amendments to incorporated material.

(b) The incorporated material may be examined at any state publications depository library, the Laboratory Services Division of the Department, or the Department at:

Colorado Department of Public Health and Environment

Water Quality Control Division

4300 Cherry Creek Drive South

Denver, Colorado 80246-1530

(303) 692-3500

(c) If the material incorporated by reference refers to other sections of the referenced document that conflict with current language of the *Colorado Primary Drinking Water Regulations* , the current language of the *Colorado Primary Drinking Water Regulations* takes precedence.

11.3 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

Definitions of general applicability to the *Colorado Primary Drinking Water Regulations* are as specified here and shall be liberally construed to protect public health and the quality of drinking water supplied to the public. Additional definitions are specified throughout the *Colorado Primary Drinking Water Regulations* and are applicable to the rule in which they are defined. As used in the *Colorado Primary Drinking Water Regulations* :

(1) "4-LOG TREATMENT OF VIRUSES" means 99.99 percent inactivation and/or removal of viruses.

(2) "ACT" means the federal Public Health Service Act, as amended by the Safe Drinking Water Act, Public Law 93-523.

(3) "AVERAGE RESIDENCE TIME" means a point in the distribution system where treated water has been in the system for approximately half of its longest or maximum time in the system, as measured by water transport time. Sample locations between 25 and 75 percent of the maximum are considered to be representative of average residence time, provided that in total, the average of the selected locations approximate 50 percent of the maximum residence time and take into account population densities and their locations.

(4) "BAG FILTERS" means pressure–driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed of 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 the outside.

(5) "BEST AVAILABLE TECHNOLOGY" or "BAT" means the best technology, treatment techniques, or other means that the EPA Administrator finds available, considering cost and after examination for efficacy under field conditions and not solely under laboratory conditions.

(6) "CARTRIDGE FILTERS" means pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed as 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.

(7) "CERTIFIED LABORATORY" means a laboratory certified by the State of Colorado for analysis of drinking water.

(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" means an 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 that supplies at least 15 service connections used by year-round residents or that regularly supplies at least 25 year-round residents.

(11) "COMPLIANCE CYCLE" means the nine-year calendar year cycle during which the supplier must monitor. Each compliance cycle consists of three three-year compliance periods.

(12) "COMPLIANCE PERIOD" means a three-year calendar year period within a compliance cycle.

(13) "CONSECUTIVE SYSTEM" means 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.

(14) "CONSTRUCTION" means the erection, building, modification, reconstruction, improvement or expansion of waterworks.

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

(16) "CONSUMER" means any person that has the opportunity to consume finished water from a public water system.

(17) "CONVENTIONAL FILTRATION TREATMENT" means a series of processes including coagulation, flocculation, sedimentation (or equivalent form of clarification), and granular media filtration

resulting in substantial particulate removal.

(18) "CROSS-CONNECTION" means any connection which could allow any used water, industrial fluid, gas, or water of a quality below the drinking water standards in these regulations to flow from any pipe, plumbing fixture, or a consumer's water system into a public water system's distribution system or any other part of the public water system. Examples of cross-connections include: by-pass arrangements, jumper connections, removable sections, swivel or changeover devices and other temporary or permanent devices through which or because of which backflow can or may occur.

(19) "CT" or "CT_{calc}" means the product of residual disinfectant concentration (C) in mg/L determined before or at the first customer, and the corresponding disinfectant contact time (T) in minutes (i.e., C x T).

(20) "CUSTOMER" means billing units or service connections that receive finished water.

(21) "DEPARTMENT" means the Colorado Department of Public Health and Environment as created by section 25-1-102(1), Colorado Revised Statutes.

(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, ozone, and ultraviolet light, 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" 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.

(26) "DISINFECTION" means a process that inactivates pathogenic microorganisms in water by chemical oxidants, ultraviolet light, or equivalent agents.

(27) "EMERGENCY SOURCE/CONNECTION" means a water facility that is only used as the result of extreme circumstances, and is otherwise kept offline. These facilities may be either connected or disconnected from a treatment plant/distribution system.

(28) "ENFORCEMENT ORDER" means an order issued for the purpose of notifying the supplier of a public water system that it is in violation of the *Colorado Primary Drinking Water Regulations* or for the purpose of requiring the supplier of a public water system to cease such violations. Enforcement orders may prescribe corrective measures necessary to achieve compliance with the *Colorado Primary Drinking Water Regulations* .

(29) "ENTRY POINT" means a location before or at the first customer which is representative of finished water. The entry point may represent finished water from multiple treatment plants and/or multiple sources.

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

(31) "FINISHED WATER" means water that is supplied to the distribution system of a public water system and intended for distribution and human consumption without further treatment, including disinfection contact time, except treatment as necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals).

(32) "FIRST CUSTOMER" means the first potable water service connection that serves finished water. Typically, the first customer is the water treatment plant's domestic water system.

(33) "FLOCCULATION" means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settled particles through gentle stirring by hydraulic or mechanical means.

(34) "GROUNDWATER" means any water under the surface of the ground that is not surface water or groundwater under the direct influence of surface water.

(35) "GROUNDWATER SYSTEM" means a public water system that uses groundwater not under the direct influence of surface water as its sole source of water and does not include public water systems that combine all of their groundwater with surface water or groundwater under the direct influence of surface water before to treatment.

(36) "GROUNDWATER UNDER THE DIRECT INFLUENCE OF SURFACE WATER" or "GWUDI" means any water beneath the surface of the ground with:

(a) Significant occurrence of insects or other macro-organisms, algae, or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium* ; or

(b) Significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH, which closely correlate to climatological or surface water conditions.

(37) "INACTIVATION" means the use of a disinfectant (e.g., chorine, chloramines, ozone) to interrupt the ability of a pathogen to replicate therefore leaving it unable to infect.

(38) "LEAD FREE" means:

(a) When used with respect to solders and flux, solders and flux containing less than or equal to (≤) 0.2 percent lead.

(b) When used with respect to pipes and pipe fittings, pipes and pipe fittings containing less than or equal to (≤) 8.0 percent lead.

(39) "LOCATIONAL RUNNING ANNUAL AVERAGE" or "LRAA" means the average of sample results for samples collected at a particular monitoring location during the most recent four calendar quarters. If the supplier fails to complete four consecutive quarters of sampling, the LRAA is based on the available sample results from the most recent four calendar quarters.

(40) "MAXIMUM CONTAMINANT LEVEL" or "MCL" means the maximum level of a contaminant allowed in drinking water, which is delivered to any consumer.

(41) "MAXIMUM CONTAMINANT LEVEL GOAL" or "MCLG" means the maximum level of a contaminant in drinking water at which no known or anticipated adverse effects on human health would occur, and which allows an adequate margin of safety. Maximum contaminant level goals are non-enforceable health goals.

(42) "MAXIMUM RESIDENCE TIME" means a point in the distribution system where the treated water has been in the system for the longest or maximum time, as measured by water transport time. Sample locations between 90 and 100 percent of the maximum are considered to be

representative of maximum residence time.

(43) "MAXIMUM RESIDUAL DISINFECTANT LEVEL" or "MRDL" means the level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse effects on human health.

(44) "MAXIMUM RESIDUAL DISINFECTANT LEVEL GOAL" or "MRDLG" means the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the human health would occur, and which allows an adequate margin of safety. MRDLGs are non-enforceable health goals and do not reflect the benefit of the addition of the chemical for control of waterborne microbial contaminants.

(45) "MEMBRANE FILTRATION" means 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.

(46) "NEW SOURCE" means a source not previously used by the public water system or a source not previously approved by the Department.

(47) "NON-COMMUNITY WATER SYSTEM" means a public water system that is not a community water system. A non-community water system is either a "transient, non-community water system" or a "non-transient, non-community water system."

(48) "NON-TRANSIENT, NON-COMMUNITY WATER SYSTEM" means a public water system that regularly serves a population of at least 25 of the same people for at least six months per year and is not a community water system.

(49) "NON-TRANSIENT POPULATION" means the average number of people served per day during the year or normal operating period(s), who do not reside at the place supplied by the system, but have a regular opportunity to consume water produced by the system. Regular opportunity is defined as four or more hours per day, for four or more days per week, for six or more months per year.

(50) "NOTIFY" means to inform by written, verbal, or other means, unless otherwise stated.

(51) "PERSON" means an individual, corporation, company, association, partnership, municipality, or State, Federal, or tribal agency.

(52) "PLANS AND SPECIFICATIONS" means the technical design drawings and specifications for waterworks. For new waterworks, this also includes technical, financial, and managerial plans.

(53) "PLANT INTAKE" or "INTAKE" means 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.

(54) "POINT-OF-ENTRY TREATMENT DEVICE" or "POE" means a treatment 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.

(55) "POPULATION SUPPLIED" means the average daily population that occurs during the busiest month of the year or normal operating period(s). Population supplied is further defined as the sum of resident, non-transient, and transient populations.

(56) "PRESEDIMENTATION" means 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.

(57) "PUBLIC WATER SYSTEM" or "PWS" means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least 25 individuals daily at least 60 days per year. A public water system is either a community water system or a non-community water system. Such term does not include any special irrigation district. Such term includes:

(a) Any collection, treatment, storage, and distribution facilities under control of the supplier of such system and used primarily in connection with such system.

(b) Any collection or pretreatment storage facilities not under such control, which are used primarily in connection with such system.

(58) "RECYCLE" means the act of returning recycle flows to a plant's primary treatment process.

(59) "RECYCLE FLOWS" means any water, solid or semi-solid, generated by a plant's treatment processes, operational processes, and residual treatment processes, that is returned to the plant's primary treatment process.

(60) "RESIDENT POPULATION" means the average number of people whose primary residence is supplied by the system. The resident does not have to live at the residence for 365 days per year for it to be considered his/her primary residence.

(61) "RESIDUAL DISINFECTANT CONCENTRATION" means the concentration of disinfectant measured in mg/L in a representative sample of water.

(62) "RUNNING ANNUAL AVERAGE or "RAA" means the average of sample results for samples collected during the most recent four calendar quarters. If the supplier fails to complete four consecutive quarters of sampling, the RAA is based on the available sample results from the most recent four calendar quarters.

(63) "SECONDARY MAXIMUM CONTAMINANT LEVELS or "SMCLs" means the maximum level of a contaminant allowed in water which is delivered to the consumer of a public water system. The SMCLs apply to public water systems and which, in the judgment of the EPA Administrator, are requisite to protect the public health. Contaminants added to the water under circumstances controlled by the consumer, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition. The SMCLs are not enforceable, but are intended as guidelines. The SMCLs are defined in 40 CFR 143.3 as amended July 1, 2013.

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

(65) "SERVICE CONNECTION" means a connection to a system that delivers water by constructed conveyance. The definition does not include connections that deliver water by a constructed conveyance other than a pipe if:

(i) The water is used exclusively for purposes other than residential uses (consisting of drinking, bathing, and cooking, or other similar uses);

(ii) The Department determines that an alternative water source to achieve the equivalent level of public health protection provided by the applicable *Colorado Primary Drinking Water Regulations* is provided for residential or similar uses for drinking and cooking; or

(iii) The Department determines that the water provided for residential or similar uses for drinking, cooking, and bathing is centrally treated or treated at the point of entry by the provider, a pass-through entity, or the user to achieve the equivalent level of protection provided by the applicable *Colorado Primary Drinking Water Regulations* .

(66) "SIGNIFICANT DEFICIENCY" means any situation, practice, or condition in a public water system with respect to design, operation, maintenance, or administration, that the state determines may result in or have the potential to result in production of finished drinking water that poses an unacceptable risk to health and welfare of the public served by the water system. Significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the Department determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

(67) "SMALL SYSTEM COMPLIANCE TECHNOLOGY" or "SSCT" means a treatment technology that is affordable (according to the affordability criteria set forth by the EPA) by small systems and allows systems to achieve compliance with the MCL or treatment technique.

(68) "SLOW SAND FILTRATION" means a process involving passage of raw water through a bed of sand at low velocity (generally less than 0.4 meters per hour (m/h)) resulting in substantial particulate removal by physical and biological mechanisms.

(69) "SOURCE" means the point at which a public water system diverts water from its natural or man-made origin.

(70) "SOURCE WATER SAMPLE" means a sample collected before any treatment that represents influent raw source water quality.

(71) "SPECIAL IRRIGATION DISTRICT" means an irrigation district in existence before May 18, 1994 that provides primarily agricultural service through a piped water system with only incidental residential or similar use where the system or the residential or similar users of the system comply with the exclusion provisions outlined in the definition of service connections.

(72) "SPENT FILTER BACKWASH WATER" means a stream containing particles that are dislodged from filter media when water is forced back through a filter (backwashed) to clean the filter. Spent filter backwash water contains particles including coagulants, metals, and microbes such as *Cryptosporidium* .

(73) "STATE" means the State of Colorado.

(74) "SUPPLIER OF WATER" or "SUPPLIER" means any person who owns or operates a public water system.

(75) "SURFACE WATER" means any water source that is open to the atmosphere and subject to surface runoff. Groundwater found to be under the direct influence of surface water is classified as surface water.

(76) "SURFACE WATER SYSTEM" means a public water system that uses, in whole or in part, surface water or groundwater under the direct influence of surface water as a source of water.

(77) "TRANSIENT, NON-COMMUNITY WATER SYSTEM" means a non-community water system that serves a population of at least 25 people per day for at least 60 days per year and is not a non-transient, non-community water system or a community water system.

(78) "TRANSIENT POPULATION" means the average number of individuals served per day during the

year or annual operating period(s), who have an opportunity to consume water from the system, but who do not meet the definition of either resident population or non-transient population.

(79) "TREATMENT TECHNIQUE REQUIREMENT" means a requirement that specifies a treatment technique(s) for a contaminant which leads to a sufficient reduction in the level of the contaminant to comply with the requirements of the *Colorado Primary Drinking Water Regulations* . A treatment technique may also be a requirement that is intended to prevent situations that have the potential to have serious adverse effects on human health.

(80) "VIOLATION" means failure to comply with any requirement of the *Colorado Primary Drinking Water Regulations* .

(81) "VIRUS" means a virus of fecal origin, which is infectious to humans by waterborne transmission.

(82) "WATERBORNE DISEASE OUTBREAK" means the 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.

(83) "WATER QUALITY CONTROL COMMISSION" means the commission that has been created within the Colorado Department of Public Health and Environment pursuant to section 25-8-201, Colorado Revised Statutes.

(84) "WATER VENDING AND DISPENSING MACHINES" means any device which, upon payment dispenses water into a container.

(85) "WHOLESALER" means any person who owns or operates and is legally responsible for a wholesale system.

(86) "WHOLESALE SYSTEM" means 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.

TABLE 11.3-I ACRONYMS AND ABBREVIATIONS

Term:	Means:
AL	Action Level
BAT	Best Available Technology
C	Disinfectant Concentration
CCR	Consumer Confidence Report
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
CFU	Colony-Forming Units
CPDWR	*Colorado Primary Drinking Water Regulations*
CPE	Comprehensive

	Performance Evaluation
CT	Disinfectant Concentration x Contact Time
CTAP	Comprehensive Technical Assistance Project
EPA	United States Environmental Protection Agency
HAA5	Haloacetic Acids
HPC	Heterotrophic Plate Count
IDSE	Initial Distribution System Evaluation
IFE	Individual Filter Effluent
LRAA	Locational Running Annual Average
LRV	Log Removal Value
$LRV_{C\text{-}Test}$	Removal Efficiency
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MFL	Million Fibers per Liter
mJ/cm^2	Millijoules per Square Centimeter
MPN	Most Probable Number
MRDL	Maximum Residual Disinfectant Level
MRDLG	Maximum Residual Disinfectant Level Goal
mrem	Millirems
nm	Nanometers
NPDWR	National Primary Drinking Water Regulations
NTU	Nephelometric Turbidity Unit
PCB	Polycarbonated Biphenyls
pCi	Picocurie
ppb	Parts Per Billion, or Micrograms (10^{-6}) per Liter (mg/L)
ppm	Parts Per Million, or Milligrams (10^{-3}) per

	Liter (mg/L)
ppq	Parts Per Quadrillion, or Picograms (10^{-12}) per Liter (pg/L)
ppt	Parts Per Trillion, or Nanograms (10^{-9}) per Liter (ng/L)
PVC	Polyvinyl Chloride
QCRV	Quality Control Release Value
RAA	Running Annual Average
SMCL	Secondary Maximum Contaminant Level
SSCT	Small System Compliance Technology
SOC	Synthetic Organic Chemical
SUVA	Specific Ultraviolet Absorbance
T	Disinfectant Contact Time
TOC	Total Organic Carbon
TTHM	Total Trihalomethanes
UV	Ultraviolet
VOC	Volatile Organic Chemical

11.4 PLANS APPROVAL FOR THE LOCATION AND CONSTRUCTION OF WATERWORKS

11.4(1) Prior Approval Requirements

(a) For new community or non-transient, non-community water systems, the supplier must not begin construction of the new water system until the supplier completes and receives Department approval of a capacity (technical, managerial and financial) assessment using the criteria found in the *New Public Water System Capacity Planning Manual.*

(b) For all public water systems, the supplier must not begin construction of any new waterworks, make improvements to or modify existing waterworks, or begin using a new source until the supplier submits and receives Department approval of plans and specifications for such construction, improvements, modifications, or use.

(i) "BEGIN CONSTRUCTION" means initiation of the physical effort to construct a project, excluding engineering, architectural, legal, fiscal and economic investigations, studies, and completion of plans and specifications, and surveys. Physical effort includes, but is not limited to, site clearance, excavation, construction, or the establishment of an office or construction building on site.

(ii) "WATERWORKS" means the facilities that are directly involved in the production, treatment,

or distribution of water for public water systems.

(iii) "NEW WATERWORKS" means:

(A) Any newly constructed public water system; or

(B) An existing system that becomes, by definition, a public water system by extending its infrastructure through physical expansion by virtue of increasing the number of connections, the number of individuals served, or by extending the number of days of service.

(iv) For community water systems, a Professional Engineer registered in the State of Colorado must design all treatment systems.

(v) Decisions regarding the review and approval of plans and specifications for new waterworks or improvements or modifications to existing waterworks shall be based on conformance to the design criteria developed by the Department specified in Policy DW-005, *State of Colorado Design Criteria for Potable Water Systems.*

(vi) The Department shall grant approval upon finding that the proposed facilities conform to the design criteria specified in Policy DW-005, *State of Colorado Design Criteria for Potable Water Systems* , and are capable of continuously complying with all applicable laws, standards, rules and regulations.

11.4(2) Siting Requirements

Waterworks must not be located at a site which:

(a) Is subject to a significant risk from earthquakes, floods, fires or other disasters which could cause a breakdown of the public water system or a portion of the public water system; or

(b) Is within the floodplain of a 100-year flood, except for intake structures. [1]

(i) The Department shall not seek to override land use decisions affecting public water systems siting which are made at the local government level.

1 Records of the 100-year projections are available at the office of the Colorado Water Conservation Board, 1313 Sherman Street, Denver, Colorado 80203.

11.4(3) Department Review Procedures

(a) No later than 45 days after receiving a request for approval of a complete set of final plans and specifications for new waterworks or improvements or modifications to existing waterworks, the Department shall review the submitted documents and provide one of the following decisions in writing regarding the plans and specifications:

(i) Approval.

(ii) Conditional approval.

(A) If the supplier refuses to accept any conditions of a conditional approval, it constitutes a denial.

(iii) Denial, including the reason for the denial.

(iv) To place the review on hold and include a list of items which must be addressed by the

responsible party before further action by the Department regarding review and approval.

(b) Approval of plans and specifications for new waterworks or improvements or modifications to existing waterworks expires one year from the date of written approval if the supplier has not begun construction.

(i) For expired approvals, if the supplier resubmits the previously approved plans and specifications to the Department for review and approval, the Department may reinstate an expired approval.

11.4(4) Procedures Upon Denial

If the Department denies approval of plans and specifications for new waterworks or improvements or modifications to existing waterworks, or if the supplier refuses to accept any conditions of a conditional approval, the supplier may request a hearing to contest the denial.

(a) Requests for a hearing must:

(i) Be filed in writing with the Department no later than 30 days after service of the statement of denial.

(ii) State the grounds on which the denial is being contested.

(iii) State the amount of time the supplier estimates will be required for the hearing.

(b) The hearing regarding the denial shall be held in accordance with applicable provisions of Article 4 of Title 24, Colorado Revised Statutes.

11.5 MONITORING PLAN RULE

11.5(1) Applicability

For all public water systems, the supplier must comply with the monitoring plan requirements specified in this rule.

11.5(2) General Requirements

(a) The supplier must develop and implement a monitoring plan which must ensure that the water quality monitoring performed by the supplier is representative of the water supplied to consumers and is consistent with regulatory requirements of the *Colorado Primary Drinking Water Regulations* .

(b) The supplier must maintain the monitoring plan and make it available for inspection by the Department.

11.5(3) Monitoring Plan Required Elements

(a) The supplier must include all of the following information in the monitoring plan:

(i) Part 1 - System Summary:

(A) The Colorado public water system identification number (PWSID).

(B) The full name of the supplier (e.g., the name of a corporation, LLC, partnership, sole proprietor, HOA, etc.).

(C) The system's mailing address.

(D) The name of the supplier's authorized contact person(s) responsible for the development and implementation of the monitoring plan, if other than the supplier.

(E) The telephone number of the supplier or the supplier's authorized monitoring plan contact person.

(F) The system's classification (i.e., community, non-transient, non-community, or transient, non-community).

(G) The total population supplied by the system, by population type (i.e., the number of resident, non-transient, and transient consumers).

(H) The physical addresses of all system facilities, including master meters, and the latitude and longitude of all facilities.

(I) The physical location of all records required under 11.36.

(ii) Part 2 - Water Sources Details:

(A) Identification of all water sources capable of being used by the system, (i.e., those connected by conveyances, whether currently producing or not).

(B) A schematic, diagram or sketch showing how the flow from each source is connected to the treatment processes and the distribution system.

(iii) Part 3 - Water Treatment Details:

(A) A summary of the system's operating characteristics.

(B) A schematic of the water treatment plant(s) identifying:

(I) All treatment processes, including all chemical feed points, and the associated periods of operation that were assumed in the design of the monitoring plan (e.g., use of peaking facilities, alternative water sources, maintenance schedules that take facilities offline, etc.).

(II) All treatment plant monitoring locations.

(iv) Part 4 - Distribution System Details:

(A) A schematic of the distribution system identifying all of the following:

(I) All entry points.

(II) All treatment facilities located after the entry point(s) (e.g., booster chlorination).

(III) All storage facilities and finished water reservoirs.

(IV) All distribution system sampling locations.

(V) All master meters.

(VI) All pump stations.

(v) Part 5 - Individual Rule Sampling Plans:

(A) For each applicable monitoring or sampling requirement:

(i) The frequency and approximate time of collection.

(ii) The monitoring and sampling location identification and associated identification number.

(iii) The justification for distribution system monitoring location selections and, if appropriate, the justification for all other monitoring and sampling location selections.

(iv) The sample preservation, quality assurance, and quality control procedures, including procedures for equipment calibration.

(v) The analysis procedure (i.e., certified laboratory or on-site by a Department-approved party).

(vi) The monitoring and sampling results presentation format.

(vii) Procedures to assess and report compliance status for MCLs, MRDLs, action levels, treatment techniques and, if applicable, disinfection byproduct precursor removal efficiency.

(viii) A process to review and update the selected distribution system monitoring and sampling locations to account for changes due to growth or other significant changes to the distribution system.

(b) The supplier may use one schematic if it includes all elements specified in 11.5(3)(a)(ii-iv).

11.5(4) Monitoring Plan Reporting Requirements

(a) For new systems, the supplier must submit the information specified in 11.5(3)(a)(i-iv) to the Department no later than the 10 th of the month following the end of the first quarter in which monitoring is required.

(i) For surface water systems supplying greater than (>) 3,300 people, the supplier must also submit a copy of the Individual Rule Sampling Plan for the following no later than the date the supplier collects the first sample: 11.23: Maximum Residual Disinfectant Levels Rule, 11.24: Disinfection Byproduct Precursors Rule, 11.25(2): Chlorite, and 11.25(3): Bromate.

(A) The Department may review and require the supplier to revise the sampling plan.

(b) The supplier must submit the Individual Rule Sampling Plan information specified in 11.5(3)(a)(v) to the Department as specified in the following rules: for integrated systems in 11.42(4) and for the Disinfection Byproducts Rule in 11.25(1)(d), and for the Groundwater Rule: Disinfection Waivers in 11.13(2).

11.5(5) Monitoring Plan Revisions

The supplier must submit any changes to the monitoring plan no later than 30 days after the effective date of the change.

11.6 RESERVED

11.7 RESERVED

11.8 SURFACE WATER TREATMENT RULE

11.8(1) General Requirements

(a) Applicability and Definitions

(i) For all surface water systems, the supplier must comply with the requirements specified in this rule.

(ii) "COMBINED FILTER EFFLUENT" means a location representative of the filtered water quality which includes the filter effluent of all filters in use at any given time and is as close as practical to the point where all individual filter effluents combine or as approved by the Department.

(iii) "COMPREHENSIVE PERFORMANCE EVALUATION" or "CPE" means a thorough review and analysis of a treatment plant's performance capabilities and associated administrative, operational 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. The CPE must include at least all of the following components:

(A) Assessment of plant performance.

(B) Evaluation of major unit processes.

(C) Identification and prioritization of performance limiting factors.

(D) Assessment of whether a CTAP would improve treatment plant performance.

(iv) "COMPREHENSIVE TECHNICAL ASSISTANCE PROJECT" or "CTAP" means a performance improvement project that uses CPE results to set priorities for process control improvements and to establish a long-term training program for staff and administrators.

(v) "FILTER PROFILE" means 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.

(vi) "INDIVIDUAL FILTER EFFLUENT" means a location representative of the filtered water quality from an individual filter's effluent which is at a point before combining with the effluent flow from other filters.

(vii) "POINT OF DISINFECTANT APPLICATION" means the point where the disinfectant is applied and water downstream of that point is not subject to recontamination.

(b) Treatment Technique Requirements

(i) The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: *Cryptosporidium* , *Giardia lamblia* , viruses, Heterotrophic Plate Count bacteria, *Legionella* , and turbidity. These

treatment techniques are as follows:

(A) At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes that reliably achieve at least the following levels of treatment:

(I) 99 percent (2-log) removal of *Cryptosporidium .*

(II) 99.9 percent (3-log) treatment, including filtration and disinfection, of *Giardia lamblia .*

(III) 99.99 percent (4-log) treatment, including filtration and disinfection, of viruses.

(ii) The supplier is considered to be in compliance with the requirements specified in 11.8(1)(b)(i), if the supplier meets all of the following:

(A) The filtration requirements specified in 11.8(2)(b).

(B) The disinfection requirements specified in 11.8(3)(b).

(iii) The supplier must not use uncovered finished water storage facilities.

(A) "UNCOVERED FINISHED WATER STORAGE FACILITY" means a tank, reservoir, or other facility used to store water that will undergo no further treatment except residual disinfection and that is open to the atmosphere without properly screened vents, screened overflow pipe, or cover.

(iv) When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with the requirements specified in this section, 11.8(1)(b), no later than 18 months after receiving written notification from the Department of the source's reclassification.

(c) Additional Requirements

(i) The supplier must have the system operated by qualified personnel who meet the requirements of Regulation 100, the *Water and Wastewater Facility Operators Certification Requirements.*

11.8(2) Filtration Requirements

(a) Applicability for Filtration Requirements

(i) For all surface water systems, the supplier must comply with the requirements specified in this section, 11.8(2).

(b) Treatment Technique Requirements for the Combined Filter Effluent

(i) The combined filter effluent treatment technique requirements are as follows:

(A) At the combined filter effluent, the supplier must:

(I) Maintain treated water turbidity levels of less than or equal to (≤) the 95 th percentile limit specified in Table 11.8-I in at least 95 percent of the

turbidity monitoring results collected each month.

(a) For systems using slow sand filtration, the Department may allow an elevated turbidity level if the Department determines there is no significant interference with disinfection at the elevated turbidity limit for that system.

(II) Maintain treated water turbidity levels that are less than or equal to (≤) the maximum limit specified in Table 11.8-I at all times.

TABLE 11.8-I TURBIDITY LIMITS

For systems using:	95th percentile limit	Maximum limit
Conventional Filtration	0.3 NTU	1 NTU
Direct Filtration	0.3 NTU	1 NTU
Slow Sand Filtration	1 NTU	5 NTU
Diatomaceous Earth Filtration	1 NTU	5 NTU
Alternative Filtration Technologies -Bag Filtration	1 NTU	5 NTU
Alternative Filtration Technologies - Cartridge Filtration	1 NTU	5 NTU
Alternative Filtration Technologies - Membranes and all other alternative filtration	As approved by the Department, but no greater than 1 NTU	As approved by the Department, but no greater than 5 NTU

(ii) If approved by the Department, the supplier may use alternative filtration technologies including membrane filtration or filtration technologies other than those specified in Table 11.8-I.

(A) In order for the Department to approve an alternative filtration technology, the supplier must demonstrate, using pilot plant studies or other means, that the filtration technology, in combination with the disinfection treatment as specified in 11.8(3)(b), consistently achieves 99 percent (2-log) removal of *Cryptosporidium* , 99.9 percent (3-log) removal and inactivation of *Giardia lamblia* , 99.99 percent (4-log) removal and inactivation of viruses.

(B) If the Department approves the use of an alternative filtration technology, the Department shall approve combined filter effluent turbidity limits that are less than or equal to (≤):

(I) 1 NTU in 95 percent of measurements collected each month; and

(II) 5 NTU at any time.

(iii) When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with the requirements specified in this section, 11.8(2)(b), no later

than 18 months after receiving written notification from the Department of the source's reclassification.

(c) Monitoring Requirements for Combined Filter Effluent Treatment Technique Requirements

(i) To determine compliance with the combined filter effluent treatment technique requirements, the supplier must monitor turbidity at least every four hours at a location(s) representative of the combined filter effluent.

(A) The supplier may monitor turbidity continuously if the supplier validates the continuous monitoring equipment for accuracy at a Department-approved regular frequency and using a Department-approved protocol.

(B) The Department may reduce the turbidity monitoring frequency to daily if the Department determines that less frequent monitoring is sufficient to indicate effective filtration performance for systems that meet one or more of the following:

(I) The system uses filtration treatment other than conventional filtration treatment, direct filtration, or diatomaceous earth filtration.

(II) The system supplies less than or equal to (≤) 500 people.

(ii) For systems using lime softening, the supplier may acidify turbidity samples before analysis using a Department-approved protocol.

(iii) When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with the requirements specified in this section, 11.8(2)(c), no later than when filtration is installed.

(d) Treatment Technique Violations for Combined Filter Effluent

(i) The following constitute combined filter effluent treatment technique violations:

(A) More than 5 percent of turbidity monitoring results in any month are greater than (>) the applicable 95th percentile limits specified in Table 11.8-I.

(B) At any time a turbidity monitoring result is greater than (>) the applicable maximum turbidity limit specified in Table 11.8-I.

(e) Response to Combined Filter Effluent Treatment Technique Violations

(i) In the event of a 95 th percentile combined filter effluent turbidity limit treatment technique violation, as specified in 11.8(2)(d)(i)(A), the supplier must:

(A) Notify the Department no later than 48 hours after the violation occurs.

(B) Distribute Tier 2 public notice as specified in 11.33.

(ii) In the event of a maximum combined filter effluent turbidity limit treatment technique violation, as specified in 11.8(2)(d)(i)(B), the supplier must consult with the Department as soon as possible but no later than 24 hours after the violation occurs.

(A) The Department shall determine from the consultation whether Tier 1 or Tier 2 public

notice is required to protect public health. The supplier must distribute public notice as specified by the Department.

(B) If the supplier fails to consult with the Department within 24 hours, the supplier must distribute Tier 1 public notice, as specified in 11.33, for the violation.

(f) Reporting Requirements for Combined Filter Effluent Monitoring

(i) For combined filter effluent turbidity monitoring results collected under 11.8(2)(c), the supplier must submit the following information no later than the 10 th of the following month:

(A) Number of combined filter effluent turbidity monitoring results recorded during the month.

(B) Number and percentage of combined filter effluent turbidity monitoring results recorded during the month that were greater than (>) the 95th percentile turbidity limit specified in 11.8(2)(b).

(C) The date and value of any combined filter effluent turbidity monitoring results collected during the month, which were greater than (>) the maximum turbidity limit.

(g) Monitoring Requirements for Individual Filter Effluent Turbidity

(i) For systems using conventional filtration treatment or direct filtration treatment, the supplier must monitor turbidity continuously at locations representative of each individual filter effluent.

(A) The supplier must record the individual filter effluent turbidity monitoring results at least every 15 minutes.

(B) The supplier must calibrate the continuous monitoring equipment using the manufacturer-specified procedure.

(C) If there is a failure of the continuous monitoring equipment, the supplier must monitor the individual filter effluent turbidity by collecting a grab sample no later than four hours after the last recorded monitoring result and continue collecting grab samples every four hours until the continuous monitoring equipment is returned to service.

(I) For systems supplying greater than or equal to (≥) 10,000 people, the supplier must resume continuous individual filter effluent turbidity monitoring no later than five working days after the equipment failure.

(II) For systems supplying less than (<) 10,000 people, the supplier must resume continuous individual filter effluent turbidity monitoring no later than 14 days after the equipment failure.

(D) For systems supplying less than (<) 10,000 people that consist of two or fewer filters, the supplier may conduct continuous combined filter effluent turbidity monitoring to represent individual filter effluent turbidity monitoring.

(I) Continuous combined filter effluent turbidity monitoring must meet the requirements specified in 11.8(2)(g)(i)(A-C).

(E) For systems using lime softening, the supplier may acidify turbidity samples before analysis using a Department-approved protocol.

(h) Reporting Requirements for Individual Filter Effluent Turbidity Monitoring

For individual filter effluent turbidity monitoring, the supplier must submit documentation that the monitoring was conducted, no later than the 10 th of the following month in which the monitoring was conducted.

(i) Response to Individual Filter Effluent Turbidity Monitoring Results for Systems Supplying Greater Than or Equal to (≥) 10,000 People

(i) If the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 1.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs and the supplier must:

(A) Produce a filter profile no later than seven days after the exceedance if the cause for the exceedance is not known.

(B) Submit all of the following no later than the 10 th of the month following the exceedance:

(I) Which filter exceeded.

(II) Date of the exceedance.

(III) The turbidity monitoring results which exceeded 1.0 NTU.

(IV) The cause for the exceedance or if the cause of the exceedance is not known, documentation that a filter profile was produced.

(ii) If, in each month, for three consecutive months, the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 1.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs.

(A) The supplier must conduct a self-assessment of that filter no later than 14 days after the exceedance.

(B) The self-assessment must include at least all of the following:

(I) Assessment of filter performance.

(II) Development of a filter profile.

(III) Identification and prioritization of factors limiting filter performance.

(IV) Assessment of the applicability of corrections.

(V) Preparation of a written self-assessment report.

(C) In addition to the reporting requirements specified in 11.8(2)(i)(i)(B), the supplier must submit notification by the 10 th of the month following the exceedance that the self-assessment was conducted.

(iii) If, in each month, for two consecutive months, the individual filter effluent turbidity monitoring

results at the same filter are greater than (>) 2.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs.

(A) The supplier must comply with the reporting requirements specified in 11.8(2)(i)(i)(B).

(B) No later than 30 days after the exceedance occurs, the supplier must arrange for a CPE to be conducted by the Department or by a Department-approved third party.

(C) No later than 90 days after the exceedance occurs, the supplier must submit the completed CPE report.

(D) If the CPE indicates the potential for improved water system performance, the supplier must complete a CTAP.

(I) During the CTAP, the supplier must identify and systematically address plant-specific factors as outlined in the CPE and include them in a report submitted no later than 90 days after the completion of the CPE.

(iv) When a filter is brought online, if after the first four hours of operation, the individual filter effluent turbidity monitoring results at that filter are greater than (>) 0.5 NTU in two consecutive readings collected 15 minutes apart, an exceedance occurs and the supplier must:

(A) Produce a filter profile no later than seven days after the exceedance if the cause for the exceedance is not known.

(B) Submit all of the following no later than the 10 th of the month following the exceedance:

(I) Which filter exceeded.

(II) Date of the exceedance.

(III) The turbidity monitoring results which exceeded 0.5 NTU.

(IV) The cause for the exceedance or if the cause of the exceedance is not known, documentation that a filter profile was produced.

(v) For systems using lime softening, the supplier may apply to the Department for higher individual filter effluent turbidity limits than the limits specified in this section, 11.8(2)(i), if the supplier can demonstrate that higher individual filter effluent limits are due only to lime carryover and not degraded filter performance.

(j) Response to Individual Filter Effluent Turbidity Monitoring Results for Systems Supplying Less Than (<) 10,000 People

(i) If the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 1.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs and the supplier must submit all of the following no later than the 10 th of the month following the exceedance:

(A) Which filter exceeded.

(B) Date of the exceedance.

(C) Turbidity monitoring results which exceeded 1.0 NTU.

(D) Cause for the exceedance, if known.

(ii) If, in each month, for three consecutive months the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 1.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs.

(A) The supplier must conduct a self-assessment of that filter no later than 14 days after the exceedance occurs, unless a CPE is required as specified in 11.8(2)(j)(iii).

(I) For systems with two or fewer filters that monitor combined filter effluent instead of individual filter effluent as specified in 11.8(2)(g)(i)(D), the supplier must conduct the self-assessment on both filters.

(B) The self-assessment must include at least all of the following:

(I) Assessment of filter performance.

(II) Development of a filter profile.

(III) Identification and prioritization of factors limiting filter performance.

(IV) Assessment of the applicability of corrections.

(V) Preparation of a written self-assessment report.

(C) In addition to the reporting requirements specified in 11.8(2)(j)(i), the supplier must submit all of the following no later than the 10 th of the month following the exceedance:

(I) The date the self-assessment was triggered.

(II) The date the self-assessment was completed.

(iii) If, in each month, for two consecutive months, the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 2.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs.

(A) No later than 60 days after the exceedance occurs, the supplier must arrange for a CPE to be conducted by the Department or by a Department-approved third party.

(B) No later than 120 days after the exceedance occurs, the supplier must submit the completed CPE report.

(C) The supplier is not required to arrange for a CPE and submit a CPE report if:

(I) A CPE has been completed by the Department or by a Department-approved third party within the last 12 months; or

(II) The supplier and Department are participating in an ongoing CTAP at the system.

(D) In addition to the reporting requirements specified in 11.8(2)(j)(i), if a CPE is required,

the supplier must submit all of the following no later than the 10 th of the month following the exceedance:

(I) That a CPE is required.

(II) The date the CPE was triggered.

(E) If the CPE indicates the potential for improved water system performance, the supplier must complete a CTAP.

(I) During the CTAP, the supplier must identify and systematically address plant-specific factors as outlined in the CPE and include them in a report submitted no later than 90 days after the completion of the CPE.

(iv) For systems using lime softening, the supplier may apply to the Department for higher individual filter effluent turbidity limits than the limits specified in this section, 11.8(2)(j), if the supplier can demonstrate that higher individual filter effluent turbidity limits are due only to lime carryover and not due to degraded filter performance.

11.8(3) Disinfection Treatment Technique Requirements

(a) Applicability for Disinfection Treatment Technique Requirements

(i) For all surface water systems, the supplier must comply with the disinfection treatment technique requirements specified in this section, 11.8(3).

(ii) When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with all of the following:

(A) Either Department-determined interim disinfection requirements or disinfection treatment technique requirements specified in 11.8(3)(b), no later than 60 days after written notification from the Department of the decision to change the source's classification; and

(B) All requirements specified in this section, 11.8(3), no later 18 months after written notification from the Department of the decision to change the source's classification or no later than when the filtration is installed, whichever is sooner.

(b) Treatment Technique Requirements for Disinfection

(i) The disinfection treatment technique requirements are as follows:

(A) The supplier must maintain disinfection treatment sufficient to ensure that the total treatment processes, including filtration and disinfection, achieve 99.9 percent (3-log) treatment of *Giardia lamblia* cysts and 99.99 percent (4-log) treatment of viruses, as determined by the Department.

(B) The supplier must maintain a residual disinfectant concentration at each entry point and throughout the distribution system.

(I) At each entry point, the residual disinfectant concentration cannot be less than (<) 0.2 mg/L for more than four hours.

(II) In the distribution system, the residual disinfectant concentration cannot be

undetectable in more than 5 percent of the samples collected in each month, for two consecutive months during which the supplier supplies water to the public.

(c) Monitoring Requirements for Disinfection Treatment Technique Requirements

(i) To determine compliance with the disinfection treatment technique requirements, the supplier must monitor the residual disinfectant concentration.

(A) At each entry point, the supplier must continuously monitor the residual disinfectant concentration.

(I) The supplier must record the lowest monitoring result each day.

(II) If there is a failure of the continuous monitoring equipment, the supplier must monitor the residual disinfectant concentration by collecting a grab sample no later than four hours after the equipment failure and continue collecting grab samples every four hours until the continuous monitoring equipment is returned to service.

(a) The supplier must resume continuous residual disinfectant concentration monitoring no later than five working days after the equipment failure.

(III) For systems supplying less than or equal to (≤) 3,300 people, the supplier is not required to monitor continuously if the supplier collects grab samples at the frequency specified in Table 11.8-II.

(a) If more than one sample per day is required, the supplier must collect the samples throughout the day. The sampling intervals are subject to Department approval.

(b) If any grab sample result is less than (<) 0.2 mg/L, the supplier must increase the monitoring frequency of the residual disinfectant concentration at that entry point to at least every four hours until the residual disinfectant concentration is greater than or equal to (≥) 0.2 mg/L.

TABLE 11.8-II MINIMUM GRAB SAMPLES

Population supplied by the system	Samples per day
≤ 500	1
501 – 1,000	2
1,001 – 2,500	3
2,501 – 3,300	4

(B) In the distribution system, the supplier must monitor the residual disinfectant concentration at the same time and at the same sampling locations that total coliform samples are collected under 11.17(3).

(I) The supplier must measure the residual disinfectant concentration as free chlorine unless the supplier uses a disinfection process that results in a

monochloramine residual disinfectant, then the supplier must measure the residual disinfectant concentration as total chlorine.

(II) For systems using both surface water and groundwater sources, the Department may allow the supplier to collect residual disinfectant concentration samples at locations other than the total coliform sampling locations if the Department determines that other locations are more representative of finished water quality in the distribution system.

(d) Treatment Technique Violations for Disinfection

(i) The following constitute disinfection treatment technique violations:

(A) At any entry point, the residual disinfectant concentration is less than (<) 0.2 mg/L for more than four hours.

(B) In the distribution system, the residual disinfectant concentration is not detectable in more than 5 percent of the samples collected in each month, for two consecutive months that the supplier supplies water to the public.

(C) Any time the supplier fails to comply with the treatment technique requirements specified in 11.8(3)(b)(i)(A).

(e) Response to Disinfection Treatment Technique Violations

(i) In the event of an entry point disinfection treatment technique violation as specified in 11.8(3)(d)(i)(A), the supplier must:

(A) Notify the Department no later than the end of the next business day.

(B) Distribute Tier 2 public notice as specified in 11.33.

(ii) In the event of a disinfection treatment technique violation as specified in 11.8(3)(d)(i)(B) or 11.8(3)(d)(i)(C), the supplier must:

(A) Notify the Department no later than 48 hours after the violation occurs.

(B) Distribute Tier 2 public notice as specified in 11.33.

(f) Reporting Requirements for Disinfection Monitoring

(i) If at any time the entry point residual disinfectant concentration is less than (<) 0.2 mg/L, the supplier must notify the Department as soon as possible but no later than the end of the next business day.

(A) The supplier must also report, no later than the end of the next business day, whether the entry point residual disinfectant concentration was restored to at least 0.2 mg/L within four hours.

(ii) For residual disinfectant concentration samples collected under 11.8(3)(c), the supplier must submit all of the following information no later than the 10 th of the following month:

(A) For each entry point, the lowest daily residual disinfectant concentration result in mg/L.

(B) The date and duration of each period when the entry point residual disinfectant concentration fell below 0.2 mg/L and when the Department was notified of the occurrence.

(C) For distribution system residual disinfectant concentration samples:

(I) The number of sample results that were undetectable.

(II) The percentage of sample results that were undetectable for each of the last two months.

(iii) If the Department determines that the supplier has submitted all the residual disinfectant concentration information as specified in 11.8(3)(f)(ii)(A-C) for at least 12 months and the supplier keeps records of the information, the supplier is not required to submit the lowest daily entry point residual disinfectant concentration results as specified in 11.8(3)(f)(ii)(A).

(g) Monitoring Requirements for Alternative Disinfection- Heterotrophic Bacteria

(i) In the distribution system, the supplier may monitor for heterotrophic bacteria, measured as Heterotrophic Plate Count (HPC), instead of residual disinfectant concentration.

(A) If the supplier is monitoring for heterotrophic bacteria instead of residual disinfectant concentration, heterotrophic bacteria concentrations less than or equal to (≤) 500 CFU/ml are considered to have a detectable residual disinfectant concentration for purposes of determining compliance with the treatment technique requirement specified in 11.8(3)(b)(i)(B)(II) and must be included with the reporting requirements specified in 11.8(3)(f)(ii)(C).

(B) If the supplier is monitoring for heterotrophic bacteria, the supplier is not required to comply with the requirements for the distribution system residual disinfectant concentration specified in this section, 11.8(3) if the Department determines that the supplier meets all of the following criteria:

(I) Providing adequate disinfection in the distribution system.

(II) Not capable of having a sample transported and analyzed for HPC by a certified laboratory within the required time and temperature conditions specified by approved analytical methods.

11.8(4) Disinfection Profiling

The purpose of disinfection profiling and benchmarking is to allow the supplier and the Department to assess whether a change in disinfection practices creates a microbial risk. The supplier must develop a disinfection profile, calculate a benchmark (lowest monthly inactivation) based on the profile, and consult with the Department before making a significant change to disinfection.

(a) Applicability and Definitions for Disinfection Profiling

(i) For new surface water systems or reclassified systems that now meet the applicability of this rule, applicability for this section, 11.8(4), is determined by evaluating TTHM and HAA5 sample results. Applicability must be determined no later than 12 months after the system is classified as a surface water system.

(A) The supplier must collect TTHM and HAA5 samples that meet the routine sampling requirements specified in 11.25(1)(c) and submit the results to the Department.

Alternatively, the supplier may:

(I) Request that the Department approve the use of a more appropriate data set for determination of applicability; or

(II) Choose not to collect the TTHM and HAA5 data, if the supplier notifies the Department of the decision. The supplier must then develop a disinfection profile to determine log inactivation of *Giardia lamblia* under 11.8(4)(a)(i)(B).

(B) The supplier must comply with the treatment technique requirement to develop a disinfection profile to determine log inactivation of *Giardia lamblia* if the system meets either of the following criteria:

(I) A system supplying greater than or equal to (≥) 10,000 people and has a TTHM annual average of quarterly samples greater than or equal to (≥) 0.064 mg/L or has an HAA5 annual average of quarterly samples greater than or equal to (≥) 0.048 mg/L.

(II) A community or non-transient, non-community water systems supplying less than (<) 10,000 people and has a TTHM sample result greater than or equal to (≥) 0.064 mg/L or has an HAA5 sample result greater than or equal to (≥) 0.048 mg/L.

(C) For systems that use chloramines, ozone, or chlorine dioxide that meet the criteria specified in 11.8(4)(a)(i)(B), the supplier must also develop a disinfection profile to determine log inactivation of viruses.

(ii) If a supplier plans to make a significant change in disinfection practices, the supplier must comply with the treatment technique requirement to develop a disinfection profile to determine log inactivation of *Giardia lamblia* and log inactivation of viruses before making the change.

(iii) "DISINFECTION PROFILE" means the graphical representation of a system's microbial inactivation over 12 consecutive months.

(iv) "SIGNIFICANT CHANGES IN DISINFECTION PRACTICE" means one or more of the following:

(A) Changes to the point of disinfection.

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

(C) Changes to the disinfection process.

(D) Any other modification identified by the Department.

(b) Monitoring Requirements for Disinfection Profiling

(i) To determine the log inactivation ratio(s) for each disinfection segment before the distribution system, the supplier must monitor the following set of parameters during daily peak hourly flow:

(A) The residual disinfectant concentration(s) (C) at each entry point.

(I) For systems with one point of disinfectant application and multiple disinfection segments, the supplier must also monitor before each sequential segment of disinfection.

(II) For systems with multiple points of disinfectant application, the supplier must also monitor before each additional point of disinfectant application.

(B) The temperature of the disinfected water at each residual disinfectant concentration sampling location or at an alternative Department-approved location(s).

(C) For systems using chlorine, the pH of the disinfected water at each residual disinfectant concentration sampling location or at an alternative Department-approved location(s).

(D) System-specific parameters to determine the disinfectant contact time(s) (T).

(ii) The supplier must monitor the set of parameters specified in 11.8(4)(b)(i) at the following frequencies:

(A) For systems meeting the criteria as specified in 11.8(4)(a)(i)(B)(I), at least daily for 12 consecutive months.

(B) For systems meeting the criteria as specified in 11.8(4)(a)(i)(B)(II) or 11.8(4)(a)(ii), at least weekly on the same calendar day for 12 consecutive months.

(C) For seasonal systems, at the frequency specified above in 11.8(4)(b)(ii)(A) or 11.8(4)(b)(ii)(B) only when the system operates.

(D) If the supplier monitors more frequently than required, the monitoring frequency must be evenly spaced.

(iii) For systems meeting the criteria specified in 11.8(4)(a)(ii) the supplier is not required to conduct monitoring as specified in 11.8(4)(b)(i-ii), if the system meets one of the following criteria:

(A) If the supplier has at least one year of existing data that are substantially equivalent to the data set required under 11.8(4)(b)(i-ii), the supplier may use this data to develop a disinfection profile(s), with the all of the following conditions:

(I) If the supplier has made a significant change to treatment practices or changed sources since the data was collected, the supplier must not use previously collected data.

(II) The supplier may develop a disinfection profile(s) using up to three years of existing data.

(B) If the supplier was required to develop a disinfection profile as specified in 11.8(4)(a)(i)(B), the supplier may use the previously developed disinfection profile(s) and is not required to develop a new disinfection profile, with all of the following conditions:

(I) If the supplier has made a significant change to treatment practices or changed sources since the disinfection profile(s) was developed, the supplier must not use a previously developed disinfection profile(s).

(II) If a virus disinfection profile(s) was not previously developed, the supplier must develop a virus disinfection profile(s) using the same monitoring data on which the *Giardia lamblia* disinfection profile(s) is based.

(c) Disinfection Profiling Calculations

(i) For each set of parameters collected under 11.8(4)(b), the supplier must calculate total inactivation ratio(s) and total logs of inactivation for *Giardia lamblia* based on the $CT_{99.9}$ values in 11.46 as follows:

(A) The supplier must determine the total inactivation ratio as follows:

Inactivation ratio is equal to: $(CT_{calc} / CT_{99.9})$.

(I) For a supplier monitoring at a single location, calculate one inactivation ratio.

(II) For a supplier monitoring at multiple locations:

(a) Determine the inactivation ratio value for each segment.

(b) Add all inactivation ratio values to determine the total inactivation ratio: $(\sum (CT_{calc} / CT_{99.9}))$.

(B) The supplier must determine the total logs of inactivation by multiplying the total inactivation ratio by 3.0.

Total logs of inactivation is equal to: $3.0 \times \sum (CT_{calc} / CT_{99.9})$.

(ii) If the supplier is required to calculate the logs of inactivation for viruses as specified in 11.8(4)(a)(i)(C) or 11.8(4)(a)(ii), the supplier must use a Department-approved calculation method.

(iii) The supplier must maintain disinfection profile data in graphic form, as a spreadsheet, or in a Department-accepted format for review as part of sanitary surveys.

(d) Treatment Technique Violations and Response for Disinfection Profiling

(i) If the supplier fails to comply with the requirements specified in this section, 11.8(4), a disinfection profiling treatment technique violation occurs.

(ii) In the event of a disinfection profile treatment technique violation, the supplier must:

(A) Notify the Department no later than 48 hours after the violation occurs.

(B) Distribute Tier 2 public notice as specified in 11.33.

11.8(5) Disinfection Benchmarking

(a) Applicability and Definitions for Disinfection Benchmarking

(i) If the supplier was required to develop a disinfection profile for *Giardia lamblia* and/or viruses as specified in 11.8(4) and plans to make a significant change in disinfection practices, as defined in 11.8(4)(a)(iv), the supplier must comply with all of the following treatment technique requirements before making the change:

(A) Calculate a disinfection benchmark for each profile developed under 11.8(4)(c).

(B) Consult with the Department.

(ii) "DISINFECTION BENCHMARK" means the lowest monthly average of total log inactivation values calculated in the disinfection profile. The disinfection benchmark is used as a baseline of inactivation when considering changes in the disinfection process.

(b) Disinfection Benchmarking Calculations

(i) The supplier must calculate a disinfection benchmark as follows:

(A) Calculate the average log inactivation for each month using the total logs of inactivation value(s) calculated in the disinfection profile developed under 11.8(4)(c).

(B) If the supplier has collected one year of data, the lowest monthly average log inactivation value is the disinfection benchmark.

(C) If the supplier has collected more than one year of data, the average of the lowest monthly average log inactivation value for each calendar year is the disinfection benchmark.

(c) Reporting Requirements for Department Consultation

(i) The supplier must submit all of the following information as part of the consultation process:

(A) A description of the proposed change in disinfection practice.

(B) The disinfection profile and benchmark for *Giardia lamblia* .

(C) If required to be developed, the disinfection profile and benchmark for viruses.

(D) An analysis of how the proposed change will affect the current levels of disinfection.

(E) Any additional information requested by the Department.

(d) Treatment Technique Violations and Response for Disinfection Benchmarking

(i) If the supplier fails to comply with the requirements specified in this section, 11.8(5), a disinfection benchmarking treatment technique violation occurs.

(ii) In the event of a disinfection benchmark treatment technique violation, the supplier must:

(A) Notify the Department no later than 48 hours after the violation occurs.

(B) Distribute Tier 2 public notice as specified in 11.33.

11.9 SURFACE WATER TREATMENT RULE: FILTER BACKWASH RECYCLE RULE

11.9(1) Applicability and Definitions

(a) For all surface water systems that use conventional filtration treatment or direct filtration treatment and that also recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes, the supplier must comply with the requirements specified in this rule.

(b) "LIQUIDS FROM DEWATERING PROCESSES" means a stream of liquids generated from a unit used to concentrate solids for disposal. Processes may consist of centrifuges, filter presses, belt presses, vacuum filters, monofills, or other sludge concentrating equipment. Such equipment may be used to dewater sludge from treatment units used in recycling processes or sludge from units found in the primary processes.

(c) "THICKENER SUPERNATANT" means a stream of liquids containing the decant from a sedimentation basin, clarifier or other unit that is used to treat water, solids, or semi-solids from the primary treatment processes. The "clear water" that exits the units after particles have been allowed to settle out is thickener supernatant (or sludge thickener supernatant).

11.9(2) Treatment Technique Requirement for Filter Backwash Recycle

The supplier must return recycled spent filter backwash water, thickener supernatant, or liquids from dewatering processes to a location within the treatment process that is before the conventional filtration treatment or direct filtration treatment or to an alternative Department-approved location.

11.9(3) Information Collection Requirements for Filter Backwash Recycle

The supplier must collect all of the following information about the recycle flow(s):

(a) A list of all recycle flows and the frequency with which they are returned.

(b) The average and maximum backwash flow rate through the filters.

(c) The average and maximum duration of the filter backwash process in minutes.

(d) The typical filter run length and a written summary of how filter run length is determined.

(e) The type of treatment provided for the recycle flow(s).

(f) If applicable, data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used, including the average dose and frequency of use, and frequency at which solids are removed.

11.9(4) Reporting Requirements for Filter Backwash Recycle

No later than 18 months after meeting the applicability of this rule, the supplier must provide the Department with written notification that includes all of the following:

(a) A plant schematic showing all of the following:

(i) The origin of all flows which are recycled.

(ii) The hydraulic conveyance used to transport the flows.

(iii) The location where the flows are re-introduced into the treatment plant.

(b) Typical recycle flow in gallons per minute.

(c) The highest observed plant flow experienced in the previous year in gallons per minute.

(d) Design flow for the treatment plant in gallons per minute.

(e) Department-approved operating capacity for the plant.

11.10 SURFACE WATER TREATMENT RULE: ENHANCED TREATMENT FOR CRYPTOSPORIDIUM

11.10(1) Applicability and Definitions

(a) For all surface water systems with their own surface water sources, the supplier must comply with the requirements specified in this rule.

(i) For wholesale systems and consecutive systems, the wholesaler and, if required, the supplier responsible for the consecutive system must comply with the requirements specified in this rule based on the population of the largest system in the combined distribution system.

(b) The requirements specified in this rule expand on the treatment technique requirements for *Cryptosporidium* in 11.8.

(c) "BANK FILTRATION" means a water treatment process that uses a well to recover surface water that has naturally infiltrated into groundwater through a river bed or bank(s). Infiltration is typically enhanced by the hydraulic gradient imposed by a nearby pumping water supply or other well(s).

(d) "TWO-STAGE LIME SOFTENING" means a process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes in series prior to filtration.

11.10(2) Source Water Monitoring Requirements

(a) General Source Water Monitoring Requirements

(i) The supplier must conduct two rounds of source water monitoring for each treatment plant to determine what level, if any, of additional *Cryptosporidium* treatment the supplier must provide.

(ii) For new systems, new sources, or reclassified systems that now meet the applicability of this rule, the supplier must conduct an initial round of source water monitoring and begin the monitoring according to a Department-approved schedule.

(A) For systems supplying greater than or equal to (≥) 10,000 people, the supplier must sample all surface water sources for *Cryptosporidium* , *E. coli* , and turbidity at least monthly for 24 consecutive months.

(B) For systems supplying less than (<) 10,000 people, the supplier must sample all surface water sources for *E. coli* at least once every two weeks for 12 consecutive months.

(I) The supplier may conduct *Cryptosporidium* monitoring as specified in 11.10(2)(a)(ii)(C) instead of conducting *E. coli* monitoring if the supplier notifies the Department no later than three months before the date the supplier is required to begin *E. coli* monitoring as specified in Table 11.10-I.

(II) The supplier may use an indicator other than *E. coli* if the supplier receives written Department-approval that includes the basis for the Department's determination that the alternative indicator will more accurately identify whether the source water requires additional treatment.

(C) For systems supplying less than (<) 10,000 people, the supplier must sample all surface water sources for *Cryptosporidium* if one of the following conditions are

met:

(I) The supplier chooses to conduct *Cryptosporidium* monitoring instead of *E. coli* monitoring as specified in 11.10(2)(a)(ii)(B)(I).

(II) Based on monitoring conducted under 11.10(2)(a)(ii)(B), the annual average *E. coli* concentration is greater than (>) 100 *E. coli* MPN/100 ml or CFU/100 ml.

(a) The supplier may use an alternative annual average *E. coli* concentration if the supplier receives written Department-approval that includes the basis for the Department's determination that the alternative annual average *E. coli* concentration will more accurately identify whether the source water requires additional treatment.

(D) If the supplier is required to conduct source water monitoring for *Cryptosporidium* under 11.10(2)(a)(ii)(C), the supplier must choose to either monitor at least twice each month for 12 consecutive months or at least monthly for 24 consecutive months.

(E) The supplier may sample more frequently than required if the sampling frequency is evenly spaced throughout the monitoring period.

(iii) The supplier must conduct a second round of source water monitoring that meets the same requirements as the initial round of source water monitoring. The supplier must begin monitoring no later than the month and year specified in Table 11.10-I.

TABLE 11.10-I SOURCE WATER MONITORING START DATES

	For systems that:	If the initial round of source water monitoring was required no later than:	The supplier must be the second round of source water monitor no later than:
Schedule 1	Supply at least 100,000 people	October 2006	April 2015
Schedule 2	Supply from 50,000 to 99,999 people	April 2007	October 2015
Schedule 3	Supply from 10,000 to 49,999 people	April 2008	October 2016
Schedule 4	Supply less than 10,000 people and only monitor for *E. coli*	October 2008	October 2017
Schedule 4	Supply less than 10,000 people and monitor for *Cryptosporidium*	April 2010	April 2019
Schedule 5	Are on a Department-approved schedule	As approved by the Department	Six years following t bin classification of t initial round

(iv) For systems or treatment plants that operate for only part of the year, the supplier must

conduct source water monitoring as specified in this section, 11.10(2)(a), with the following modifications:

(A) The supplier must conduct source water monitoring only during the months that the treatment plant operates unless the Department specifies another monitoring period based on plant operating practices.

(B) If a treatment plant operates fewer than six months per year and the supplier monitors for *Cryptosporidium* , the supplier must collect at least six *Cryptosporidium* source water monitoring samples in each of the two consecutive 12-month periods of the 24-month monitoring period.

(I) The supplier must collect source water samples at a frequency that is evenly spaced throughout the period that the plant operates.

(v) The supplier is not required to conduct source water monitoring if the supplier will provide a total of at least 5.5-log treatment for *Cryptosporidium* , equivalent to meeting the treatment requirements of a Bin 4 classification as specified in 11.10(4)(a).

(A) If the supplier chooses to provide at least 5.5-log treatment for *Cryptosporidium* instead of conducting source water monitoring, the supplier must notify the Department in writing no later than three months before the month the supplier is required to begin monitoring in as specified in Table 11.10-I.

(B) The supplier may choose to stop source water monitoring at any time after beginning the monitoring if the supplier notifies the Department in writing that it will provide at least 5.5-log treatment for *Cryptosporidium* .

(C) The supplier must install and operate technologies to provide at least 5.5-log of treatment for *Cryptosporidium* no later than the applicable treatment compliance date specified in 11.10(4)(a).

(b) Source Water Monitoring Schedules

(i) The supplier must submit a monitoring schedule that specifies the calendar dates for the collection of each required sample.

(A) For each round of monitoring, the supplier must submit the monitoring schedule no later than three months before the applicable start date specified in Table 11.10-I.

(B) If the Department does not respond to the supplier regarding the monitoring schedule by the beginning date of the schedule, the supplier must sample as specified in the submitted schedule.

(ii) The supplier must collect source water monitoring samples no earlier than two days before and no later than two days after the dates specified in the monitoring schedule (i.e., within a five-day period) unless one of the following conditions applies:

(A) If an extreme condition or situation exists that may pose a danger to the supplier or that cannot be avoided and causes the supplier to be unable to sample in the scheduled five-day period, the supplier must:

(I) Sample as close to the scheduled date as possible unless the Department approves an alternative replacement sampling date.

(II) Submit an explanation for the delayed sample to the Department at the same time the sample is sent to the laboratory.

(B) If the supplier is unable to report a valid analytical sample 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); or the failure of an approved laboratory to analyze the sample, then the supplier must:

(I) Collect a replacement sample no later than 21 days after receiving notification from the laboratory that a sample result cannot be reported for the scheduled date unless one or more of the following conditions are met:

(a) The supplier demonstrates that collecting a replacement sample within this time frame is not feasible.

(b) The Department approves an alternative replacement sampling date.

(II) Submit an explanation for the delayed sample to the Department at the same time the replacement sample is sent to the laboratory.

(iii) If the supplier fails to collect any source water monitoring sample within the five-day period for any reason other than those specified in 11.10(2)(b)(ii)(A-B), the supplier must revise the monitoring schedule to reschedule all missed samples. The supplier must submit the revised monitoring schedule to the Department for approval before collecting the missed samples.

(c) Source Water Monitoring Sampling Locations

(i) For each round of monitoring, the supplier must submit a description of the sampling location(s) no later than three months before the applicable start date specified in Table 11.10-I.

(A) The description must address the site of the sampling location(s) in relation to the water source(s) and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle.

(B) If the Department does not respond to the supplier regarding the sampling location(s) by the beginning date of the monitoring schedule, the supplier must sample at the submitted sampling location(s).

(ii) The supplier must collect source water monitoring samples before each treatment plant that treats a surface water source.

(A) If multiple treatment plants draw water from the same influent, such as the same pipe or intake, the Department may approve one set of source water monitoring sample results from the influent to satisfy the source water monitoring requirements for each treatment plant that uses that influent.

(iii) The supplier must collect source water monitoring samples before all chemical treatment.

(A) If the Department determines that collecting a sample before chemical treatment is not possible for the supplier and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample, the Department may approve the collection of source water monitoring samples after that chemical

treatment.

(iv) For systems with treatment plants that use multiple surface water sources or blended surface water and groundwater sources, the supplier must:

(A) Collect source water monitoring samples during normal operating conditions.

(B) If a sampling location where the sources are combined before treatment is available, collect source water monitoring samples from that location.

(C) If a sampling location where the sources are combined before treatment is not available, collect source water monitoring samples from each source's intake on the same day. The supplier must comply with one of the following:

(I) Have a source water monitoring sample analyzed from each source and calculate a weighted average of the sample results based on plant flow at the time the sample is collected.

(II) Composite samples from each source into one sample before analysis.

(a) For composite samples, the volume of water from each source must be proportionate to the use of that source in the total plant flow at the time the sample is collected.

(v) For systems that recycle spent filter backwash water, the supplier must collect source water samples before the location of filter backwash water addition.

(vi) For systems that use bank filtration to comply with 11.8, the supplier must collect source water monitoring samples before the bank filtration.

(vii) For systems that use bank filtration as pretreatment to a filtration treatment plant, the supplier must collect source water monitoring samples after the bank filtration.

(A) The supplier must collect source water monitoring samples during periods of normal operating conditions.

(B) The supplier cannot receive treatment credit for the bank filtration as specified in 11.10(5)(f), to comply with the additional *Cryptosporidium* treatment technique requirements.

(d) Reporting Requirements for Source Water Monitoring Sample Results

(i) The supplier must submit source water monitoring sample results no later than the 10 th of the second month following the month when the sample(s) was collected.

(ii) For each source water monitoring *Cryptosporidium* sample, the supplier must submit all of the following:

(A) State-assigned facility ID.

(B) Sample collection date.

(C) Sample type (i.e., field or matrix spike).

(D) Filtered sample volume in liters, to the nearest one-fourth liter.

(E) Percentage of filtered sample volume examined.

(F) Number of oocysts counted.

(G) For matrix spike samples, the sample volume spiked and estimated number of oocysts spiked.

(H) For samples where less than 10 liters are filtered or less than 100 percent of the sample volume is examined, the number of filters used and the packed pellet volume.

(I) For samples where less than 100 percent of sample volume is examined, the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.

(iii) For each source water monitoring *E. coli* sample, the supplier must submit all of the following:

(A) State-assigned facility ID.

(B) Sample collection date.

(C) Analytical method number.

(D) Method type.

(E) Number of *E. coli* MPN/100 ml or CFU/100 ml.

(F) For systems supplying greater than or equal to (≥) 10,000 people, turbidity.

(e) Response to Repeated Failures to Monitor for *Cryptosporidium*

(i) If the supplier fails to monitor in any three months in either round of *Cryptosporidium* source water monitoring, the supplier must distribute Tier 2 public notice that:

(A) Meets the requirements specified in 11.33.

(B) Includes the following language and provides the specific information for the text in brackets:

(I) 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].

(C) Includes a description of what the supplier is doing to correct the violation and when

the supplier expects to return to compliance or resolve the situation.

(f) Grandfathering Previously Collected Source Water Monitoring Sample Results

(i) The supplier is not required to conduct some or all of the initial source water monitoring if the Department approves the grandfathering of source water monitoring samples that were collected before the applicable start date specified in Table 11.10-I.

(ii) For source water monitoring sample results to qualify for grandfathering, the analysis of source water *Cryptosporidium* samples and/or source water *E. coli* samples must meet the applicable analytical method and approved laboratory requirements specified in 11.46.

(iii) *Cryptosporidium* samples collected without corresponding *E. coli* and turbidity samples may qualify for grandfathering.

(A) If *Cryptosporidium* samples collected without corresponding *E. coli* and turbidity samples are grandfathered, the supplier is not required to collect *E. coli* and turbidity samples when completing the initial source water monitoring requirements for *Cryptosporidium* .

(iv) For source water monitoring sample results to qualify for grandfathering, the samples must have been collected as follows:

(A) The supplier must have collected *Cryptosporidium* samples no less frequently than monthly and with regular sample collection intervals.

(I) The supplier may grandfather source water monitoring samples that do not meet the monthly sampling frequency requirement, if the supplier conducts additional Department-specified monitoring to ensure that the source water monitoring sample results are seasonally representative and unbiased.

(II) If sample collection intervals vary for the reasons specified in 11.10(2)(b)(ii)(A-B), the supplier must submit documentation of the conditions that created the variations when reporting the source water monitoring sample results.

(B) The supplier must have collected *Cryptosporidium* samples no earlier than January 1999.

(C) The sampling location must meet the requirements specified in 11.10(2)(c).

(v) The supplier must submit intent to grandfather source water monitoring sample results no later than three months before the applicable start date specified in Table 11.10-I.

(A) The submission must include all of the following:

(I) The number of previously collected source water monitoring sample results the supplier will submit.

(II) The collection dates of the first and last source water monitoring sample results.

(III) If the supplier will conduct additional source water monitoring to meet the

requirements specified in 11.10(2)(a)(ii).

(vi) For each previously collected source water monitoring sample intended for grandfathering, the supplier must submit, for approval, all of the following information no later than two months after the applicable start date specified in Table 11.10-I:

(A) The source water monitoring sample results. The supplier is not required to report matrix spike sample results.

(B) The applicable information as specified in 11.10(2)(d)(ii-iii).

(C) Certification that the submitted source water monitoring sample results include the results of all source water monitoring samples collected between the collection dates of the first reported result and the final reported result that meet the requirements specified in this section, 11.10(2)(f).

(D) Certification that the source water monitoring samples were representative of the treatment plant's source water and that the source water has not changed.

(E) A description of the sampling location which must address the site of the sampling location(s) in relation to the water source(s) and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle.

(F) For *Cryptosporidium* samples, a letter from each laboratory that analyzed the samples certifying that the quality control criteria specified in the approved methods were met for each sample batch associated with the submitted source water monitoring sample results.

(I) Alternatively, the supplier may submit the bench sheets and sample examination report forms from the laboratory for each field, matrix spike, initial precision and recovery, ongoing precision and recovery, and method blank sample that are associated with the submitted source water monitoring sample results.

(vii) If the supplier submits source water monitoring sample results to be grandfathered that were not collected during times of normal source water conditions, such as during a drought, the Department may reject the source water monitoring sample results for grandfathering.

(A) The Department may subsequently approve rejected source water monitoring sample results if the supplier submits any Department-requested additional data about the source water to establish that the source water monitoring sample results are representative of average source water conditions.

(viii) If the supplier submits source water monitoring sample results to be grandfathered that are rejected by the Department and the supplier does not have a sufficient number of sample results to comply with the initial source water monitoring requirements, the supplier must replace the rejected samples by conducting additional source water monitoring as specified in this section, 11.10(2).

(A) The supplier is not required to begin the additional source water monitoring until two months after notification from the Department that samples were rejected and additional source water monitoring is required.

11.10(3) Requirements for Bin Classification

(a) Bin Classification Determination

(i) For systems supplying less than (<) 10,000 people where the supplier only monitored for *E. coli* and was not required to monitor for *Cryptosporidium* , the bin classification is Bin 1.

(ii) For systems where the supplier monitored for *Cryptosporidium* , the supplier must use the source water monitoring sample results from each round of source water monitoring to calculate the average *Cryptosporidium* concentration as specified in 11.10(3)(a)(iii) and use Table 11.10-II to determine the bin classification.

(iii) For systems where the supplier monitored for *Cryptosporidium* , after completing each round of source water monitoring, the supplier must calculate that round's average *Cryptosporidium* concentration using the *Cryptosporidium* source water monitoring sample results from that round as follows:

(A) If the supplier collected at least 48 samples, the average *Cryptosporidium* concentration is equal to the average of all sample result concentrations.

(B) If the supplier collected at least 24 samples but fewer than 48 samples, the average *Cryptosporidium* concentration is equal to the highest RAA of sample result concentrations in the 24 month monitoring period.

(C) If the system supplies less than (<) 10,000 people and the supplier monitored for *Cryptosporidium* for only 12 months, the average *Cryptosporidium* concentration is equal to the average of all sample result concentrations.

(D) If the system or treatment plant operates for only part of the year, the average *Cryptosporidium* concentration is equal to the highest average of all sample result concentrations collected during any year of *Cryptosporidium* monitoring.

(E) If the supplier collected more than one sample in any month, the supplier must calculate a monthly average of sample result concentrations for each month of monitoring and then use the monthly averages in the applicable calculation specified above in 11.10(3)(a)(iii)(A-D) instead of using individual sample result concentrations.

(iv) Using the average *Cryptosporidium* concentration calculated above, the supplier must use Table 11.10-II to determine the initial bin classification for the initial round of source water monitoring and the second bin classification for the second round of source water monitoring.

TABLE 11.10-II BIN CLASSIFICATION

For systems with an average *Cryptosporidium* concentration of:	The bin classification is:
<0.075 oocyst/L	Bin 1
≥0.075 oocyst/L and <1.0 oocyst/L	Bin 2
≥1.0 oocyst/L and <3.0 oocyst/L	Bin 3
≥3.0 oocyst/L	Bin 4

(b) Treatment Technique Requirement for Bin Classification

(i) The supplier must submit the bin classification for each round of source water monitoring for Department approval no later than six months after each round of source water monitoring is required to be completed.

(A) The bin classification submission must include a summary of the individual source water monitoring results and the calculation used to determine the bin classification.

(c) Treatment Technique Violation for Bin Classification

If the supplier fails to comply with the requirements specified in 11.10(3)(b)(i), a bin classification treatment technique violation occurs.

(d) Response to Treatment Technique Violation for Bin Classification

(i) In the event of a bin classification treatment technique violation, the supplier must:

(A) Notify the Department no later than 48 hours after the violation occurs.

(B) Distribute Tier 2 public notice that:

(I) Meets the requirements specified in 11.33.

(II) Includes the following language and provides the specific information for the text in brackets:

(a) 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].

(III) Includes a description of what the supplier is doing to correct the violation and when the supplier expects to return to compliance.

11.10(4) Requirements for Additional Cryptosporidium Treatment

(a) Treatment Technique Requirements for Additional *Cryptosporidium* Treatment

(i) Based on the initial bin classification determined under 11.10(3)(a) and the system's current treatment, the supplier must provide the applicable level of additional *Cryptosporidium* treatment as specified in Table 11.10-III.

(A) If the second bin classification is different than the initial bin classification, the supplier must provide the applicable level of additional *Cryptosporidium* treatment as specified in Table 11.10-III based on the second bin classification.

TABLE 11.10-III ADDITIONAL *CRYPTOSPORIDIUM* TREATMENT REQUIREMENTS

.	Conventional filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration
Bin 1	No additional treatment	No additional treatment	No additional treatm
Bin 2	1-log treatment	1.5-log treatment	1-log treatment
Bin 3	2-log treatment	2.5 log treatment	2-log treatment
Bin 4	2.5-log treatment	3-log treatment	2.5-log treatment

1 The total *Cryptosporidium* removal and inactivation must be at least 4.0-log.

2 The total *Cryptosporidium* removal and inactivation must be at least 5.0-log.

3 The total *Cryptosporidium* removal and inactivation must be at least 5.5-log.

(ii) The supplier must use one or more of the treatment and/or management options specified in the Microbial Toolbox in 11.10(5)(b) through 11.10(5)(o) to comply with the additional *Cryptosporidium* treatment requirements.

(A) For systems classified in Bin 3 or Bin 4, the supplier must achieve at least 1-log of the additional *Cryptosporidium* treatment by using one or more of the following treatment and/or management options:

(I) Bag filters.

(II) Bank filtration.

(III) Cartridge filters.

(IV) Chlorine dioxide.

(V) Membranes.

(VI) Ozone.

(VII) UV.

(iii) The supplier must begin complying with the additional *Cryptosporidium* treatment requirements for the initial bin classification no later than the applicable dates specified in Table 11.10-IV.

TABLE 11.10-IV ADDITIONAL *CRYPTOSPORIDIUM* TREATMENT COMPLIANCE DATES

For systems that were required to conduct source water monitoring as specified in Table 10-1 on:	The supplier must comply with additional *Cryptosporidium* treatment requirements no later than: [1]

Schedule 1	April 1, 2012
Schedule 2	October 1, 2012
Schedule 3	October 1, 2013
Schedule 4	October 1, 2014
Schedule 5	As approved by the Department

1 The Department may allow up to an additional two years for complying with the treatment requirement for suppliers making capital improvements.

(iv) The supplier must begin complying with the additional *Cryptosporidium* treatment requirements for the second bin classification on a Department-approved schedule.

(v) If the Department determines that after the supplier completed either round of source water monitoring significant changes occurred in the system's watershed that could lead to increased *Cryptosporidium* contamination of the source water, the supplier must take Department-specified actions to address the potential for contamination.

(A) These actions may include additional source water monitoring and/or implementing Microbial Toolbox options specified in 11.10(5)(b) through 11.10(5)(o).

(b) Treatment Technique Violation and Response for Additional *Cryptosporidium* Treatment

(i) If in any month the supplier fails to maintain the additional *Cryptosporidium* treatment specified in 11.10(4)(a) by not meeting the applicable criteria of the Microbial Toolbox options specified in 11.10(5)(b) through 11.10(5)(o), a *Cryptosporidium* treatment technique violation occurs.

(ii) In the event of a *Cryptosporidium* treatment technique violation, the supplier must:

(A) Notify the Department no later than 48 hours after the violation occurs.

(B) Distribute Tier 2 public notice as specified in 11.33.

11.10(5) Requirements for Microbial Toolbox Options

(a) Microbial Toolbox Options for Meeting Additional *Cryptosporidium* Treatment Requirements

(i) The supplier must use one or more of the Microbial Toolbox options specified in 11.10(5)(b) through 11.10(5)(o) to comply with the treatment technique requirements for additional *Cryptosporidium* treatment.

(ii) If the supplier meets the conditions for a Microbial Toolbox option specified in 11.10(5)(b) through 11.10(5)(o), the supplier receives the treatment credits specified in Table 11.10-V for that Microbial Toolbox option.

TABLE 11.10-V MICROBIAL TOOLBOX OPTIONS SUMMARY
TABLE: TREATMENT CREDITS AND CRITERIA

Toolbox option	*Cryptosporidium* treatment credit	Design and implementation criteria	Criteria specified in:
Watershed control program	0.5-log credit	Department-approved program including	11.10(5)(b)

		required elements, annual program status report to Department, and regular watershed survey.	
Alternative source/intake management	N/A	The supplier may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies.	11.10(5)(c)
Presedimentation basin with coagulation	0.5-log credit	During any month that presedimentation basins achieve a monthly average reduction of at least a 0.5-log of turbidity or alternative Department-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through basins.	11.10(5)(d)
Two-stage lime softening	0.5-log credit	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.	11.10(5)(e)
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.	11.10(5)(f)
Combined filter performance	0.5-log credit	Combined filter effluent turbidity less than or equal (≤) to 0.15 NTU in at least 95 percent of monitoring results collected each month.	11.10(5)(g)

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 monitoring results collected each month for each filter and is never greater than (>) 0.3 NTU in two consecutive recordings for any filter.	11.10(5)(h)
Individual Bag or cartridge filters	Up to 2-log credit	Based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety.	11.10(5)(i)
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.	11.10(5)(i)
Membrane filtration	Based on testing results	Log credit equivalent to removal efficiency demonstrated during challenge testing for a device if supported by direct integrity testing.	11.10(5)(j)
Second stage filtration	0.5-log credit	Second granular media filtration stage if treatment train includes coagulation before the first filter.	11.10(5)(k)
Slow sand filters	2.5-log credit as a secondary filtration process; 3.0-log credit as a primary filtration process	Chlorination is not allowed before either option.	11.10(5)(l)
Chlorine dioxide	Based on measured CT in relation to CT table.		11.10(5)(m)
Ozone	Based on measured CT in relation to CT table		11.10(5)(m)
Ultraviolet Light (UV)	Based on validated UV dose in relation to UV dose table	Reactor validation testing required to establish UV dose and associated	11.10(5)(n)

		operating conditions.	
Demonstration of performance	As approved by the Department	Credit awarded to unit process or treatment train based on a demonstration to the Department with a Department-approved protocol.	11.10(5)(o)

(b) Watershed Control Program

(i) The supplier receives 0.5-log *Cryptosporidium* treatment credit if the supplier implements a watershed control program that meets the requirements specified in this section, 11.10(5)(b).

(ii) If the supplier intends to apply for the watershed control program treatment credit, the supplier must notify the Department of this intent no later than two years before the applicable treatment compliance date specified in 11.10(4)(a).

(iii) The supplier must submit a proposed watershed control plan to the Department for approval no later than one year before the applicable treatment compliance date specified in 11.10(4)(a).

(A) The watershed control plan must include all of the following:

(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.

(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 supplier will take to reduce source water *Cryptosporidium* levels.

(V) An explanation of how the specific actions are expected to contribute to achieving specific goals.

(VI) Identification of watershed partners and their roles.

(VII) Identification of resource requirements and commitments.

(VIII) A schedule for plan implementation with deadlines for completing specific actions identified in the plan.

(iv) For the supplier to receive watershed control program treatment credit, the Department must approve the watershed control plan.

(A) If the Department does not respond to the supplier regarding approval of a watershed control plan and the supplier meets the requirements specified in this section, 11.10(5)(b), the watershed control program will be considered approved and 0.5 log *Cryptosporidium* treatment credit will be awarded.

(I) If the Department subsequently finds the watershed control plan to be insufficient the Department may withdraw the approval.

(v) To maintain the 0.5-log *Cryptosporidium* treatment credit:

(A) The supplier must submit an annual watershed control program status report which must include all of the following:

(I) A description of the supplier's implementation of the approved watershed control plan and an assessment of the adequacy of the plan to meet its goals.

(II) An explanation of how the supplier is addressing any shortcomings in plan implementation, including those identified by the Department or as the result of a watershed sanitary survey.

(III) A description of any significant changes that have occurred in the watershed since the last watershed sanitary survey.

(IV) Any significant changes to the approved watershed control program that the supplier determines during implementation are necessary. The supplier must submit these changes before modifying the approved watershed control program.

(a) If the changes have the potential to reduce the level of source water protection, the supplier must also list in the submission the actions the supplier will take to mitigate this effect.

(B) A watershed sanitary survey must be conducted according to Department guidelines and by a Department-approved party.

(I) The supplier must have a watershed sanitary survey completed:

(a) For community water systems, every three years.

(b) For non-community water systems, every five years.

(II) The supplier must submit the watershed sanitary survey report to the Department.

(III) The watershed sanitary survey must meet all of the following criteria:

(a) Include the area of influence identified in the Department-approved watershed control plan.

(b) Evaluate the implementation of actions to reduce source water *Cryptosporidium* levels.

(c) Identify any significant new sources of *Cryptosporidium* .

(C) If the Department determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, another watershed sanitary survey must be conducted according to a Department-approved schedule.

(D) The supplier must make the watershed control plan, annual watershed control program status report, and watershed sanitary survey reports available to the public upon request.

(I) The documents must be written in plain language and include criteria to evaluate the success of the program in achieving the watershed control plan goals.

(II) If approved by the Department, the supplier may withhold portions of the watershed control plan, annual watershed control program status report, and watershed sanitary survey reports from the public based on source water security considerations.

(vi) If the Department determines that the supplier is not complying with the approved watershed control plan, the Department may withdraw the watershed control program treatment credit.

(c) Alternative Source

(i) If approved by the Department, the supplier may determine the bin classification, as specified in 11.10(3)(a), based on alternative source water monitoring results. If the supplier conducts alternative source water monitoring, the monitoring must meet one of the following criteria:

(A) Be at a different intake location for the current source(s).

(B) Be at an intake location for an alternative source(s).

(C) Use a different procedure for the timing or depth of withdrawal from the current source.

(ii) The supplier must concurrently conduct source water monitoring, as specified in 11.10(2), and the alternative source water monitoring.

(iii) The supplier must conduct the alternative source water monitoring such that it meets the requirements for source water monitoring to determine bin classification as specified in 11.10(2).

(iv) The supplier must report the alternative source water monitoring results, along with supporting information documenting the operating conditions under which the samples were collected.

(v) If the supplier chooses to determine the bin classification as specified in 11.10(3)(a) using the alternative source water monitoring results instead of using the source water monitoring results from the current source, the supplier must relocate the intake(s) or permanently adopt the withdrawal procedure used in the alternative source water monitoring, no later than the applicable treatment compliance date specified in 11.10(4)(a).

(d) Presedimentation

(i) The supplier receives 0.5-log *Cryptosporidium* treatment credit for a presedimentation basin in each month that all of the following criteria are met:

(A) The supplier continuously operates the presedimentation basin and treats the entire plant flow coming from the surface water source(s).

(B) The supplier continuously adds a coagulant to the presedimentation basin.

(C) The presedimentation process meets one of the following performance criteria:

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

(II) Demonstrates at least 0.5-log average reduction of influent turbidity.

(a) The supplier must sample the influent and effluent to the presedimentation process daily for turbidity to determine if the process meets the required average reduction of influent turbidity

(b) The average reduction of influent turbidity must be calculated as follows: $\log_{10}$ (monthly average of daily influent turbidity)-$\log_{10}$ (monthly average of daily effluent turbidity).

(e) Two-stage Lime Softening

(i) The supplier receives 0.5-log *Cryptosporidium* treatment credit for a two-stage lime softening plant if all of the following criteria are met:

(A) Chemical addition and hardness precipitation occur in two separate and sequential softening stages before filtration.

(B) Both softening stages treat the entire plant flow coming from the surface water source(s).

(f) Bank Filtration

(i) The supplier may receive either of the following *Cryptosporidium* treatment credit for bank filtration that is used as pretreatment to a filtration plant:

(A) For wells that have a groundwater flow path of at least 25 feet, the supplier receives 0.5-log *Cryptosporidium* treatment credit.

(B) For wells that have a groundwater flow path of at least 50 feet the supplier receives 1.0-log *Cryptosporidium* treatment credit.

(ii) The groundwater flow path is determined as follows:

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

(B) For horizontal wells, the groundwater flow path is the measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral

screen.

(iii) The supplier receives the *Cryptosporidium* treatment credit if all of the following criteria are met:

(A) The well is a horizontal or vertical well.

(B) The well is in a granular aquifer which is comprised of sand, clay, silt, rock fragments, pebbles or larger particles, or minor cement.

(I) The supplier must extract a core from the aquifer at the well site and demonstrate that in at least 90 percent of the core length, grains less than 1.0 mm in diameter make up at least 10 percent of the core material.

(C) The supplier monitors each wellhead for turbidity at least every four hours while the bank filtration process is in operation.

(I) If the monthly average turbidity level, based on highest daily turbidity measurements, is greater than (>) 1 NTU, the supplier must conduct an assessment to determine the cause of the exceedance.

(a) The supplier must submit the monthly average turbidity level and the assessment no later than 30 days after the month in which the exceedance occurred.

(II) If the Department determines that microbial removal capability has been compromised, the Department may withdraw the bank filtration treatment credit until the supplier implements Department-approved corrective actions.

(iv) The Department may approve *Cryptosporidium* treatment credit for bank filtration based on a demonstration of performance study. The treatment credit received may be greater than (>) 1.0-log and may be given to bank filtration that does not meet the criteria specified in 11.10(5)(f)(i-iii).

(A) The study must comply with Department-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.

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

(v) For systems that were using bank filtration as pretreatment to a filtration treatment plant before beginning source water monitoring and where the supplier collected source water monitoring samples after bank filtration, the supplier cannot receive treatment credit for the bank filtration.

(vi) Springs and infiltration galleries are not eligible for treatment credit under this section, 11.10(5)(f), but are eligible for credit under a demonstration of performance as specified in 11.10(5)(o).

(g) Combined Filter Performance

(i) For systems using conventional filtration treatment or direct filtration treatment, the supplier receives 0.5-log *Cryptosporidium* treatment credit for combined filter effluent performance for each month the combined filter effluent turbidity monitoring results are less than or equal to (≤) 0.15 NTU in at least 95 percent of the turbidity monitoring results collected in that month.

(A) Compliance will be based on the combined filter effluent turbidity monitoring results collected under 11.8(2)(c).

(h) Individual Filter Performance

(i) For systems using conventional filtration treatment or direct filtration treatment, the supplier receives 0.5-log *Cryptosporidium* treatment credit for individual filter effluent performance for each month that all of the following criteria are met, based on the individual filter effluent turbidity monitoring results collected under 11.8(2)(g):

(A) The individual filter effluent turbidity monitoring results are less than or equal to (≤) 0.15 NTU in at least 95 percent of the turbidity monitoring results collected in that month; and

(B) No individual filter has turbidity monitoring results greater than (>) 0.3 NTU in two consecutive readings collected 15 minutes apart.

(ii) If the supplier fails to meet the requirements specified in 11.10(5)(h)(i) in any month, a *Cryptosporidium* treatment technique violation, as specified in 11.10(4)(b)(i), does not occur if the Department determines all of the following are met:

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

(B) That the system has not experienced more than two such failures in any calendar year.

(i) Bag and Cartridge Filters

(i) The supplier receives up to 2.0-log *Cryptosporidium* treatment credit for an individual bag or cartridge filter and up to 2.5-log *Cryptosporidium* treatment credit for bag or cartridge filters operated in series that meet the criteria of this section, 11.10(5)(i).

(ii) The bag or cartridge filters must treat the entire plant flow coming from the surface water source(s).

(iii) The level of *Cryptosporidium* treatment credit received for bag or cartridge filters is based on the removal efficiency demonstrated during challenge testing conducted according to the following criteria:

(A) 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 supplier will use for *Cryptosporidium* treatment.

(B) Bag or cartridge filters must be challenge tested in the configuration that the supplier will use either as individual filters or as a series of filters.

(C) Challenge testing must be conducted using one or more of the following challenge particulates: *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts.

(D) The concentration of the challenge particulate 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.

(E) 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:

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

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

(G) Each filter evaluated must be tested until 100 percent of the terminal pressure drop is reached. This establishes the maximum pressure drop under which the filter may be used.

(H) Removal efficiency of the filter must be determined from the results of the challenge test and expressed in terms of log removal values (LRV) 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

C_p = the filtrate concentration measured during the challenge test.

(I) The same units must be used for the feed and filtrate concentrations.

(II) If the challenge particulate is not detected in the filtrate, then the term C_p must be set equal to the detection limit.

(I) Each filter tested must be challenged with the challenge particulate during the following three challenge periods over the filtration cycle:

(I) Within two hours of start-up of a new filter.

(II) When the pressure drop is between 45 and 55 percent of the terminal pressure drop.

(III) At the end of the cycle after the pressure drop has reached 100 percent of the terminal pressure drop.

(J) The LRV must be calculated for each of the challenge periods for each filter tested. The LRV for the filter (LRV_{filter}) must be assigned the value of the lowest LRV observed during the three challenge periods for that filter.

(K) If fewer than 20 filters are tested, the overall removal efficiency for the filter product line is equal to the lowest LRV_{filter} for the filters tested.

(L) If 20 or more filters are tested, the overall removal efficiency for the filter product line is equal to the 10^{th} percentile of the set of LRV_{filter} values for the filters tested.

(I) 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 10^{th} percentile may be calculated using linear interpolation.

(M) To determine removal credit, 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 the challenge testing results.

(N) The supplier must submit the challenge testing results.

(O) If a filter is challenge tested and the filter is later modified in a manner that could change the removal efficiency of the filter product line, the supplier must have a challenge test conducted to demonstrate the removal efficiency of the modified filter and the supplier must submit the test results to the Department.

(j) Membrane Filtration

(i) The supplier receives *Cryptosporidium* treatment credit for membrane filtration that meets the criteria of this section, 11.10(5)(j). The supplier receives *Cryptosporidium* treatment credit that is equal to whichever of the following is lower:

(A) The removal efficiency demonstrated during challenge testing conducted as specified in 11.10(5)(j)(ii).

(B) The highest removal efficiency that can be verified through direct integrity testing as specified in 11.10(5)(j)(iii).

(ii) To receive *Cryptosporidium* treatment credit the membrane used by the system must be challenge tested to demonstrate removal efficiency. The challenge test must be conducted according to the following criteria:

(A) Challenge testing must be performed on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment plant, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module.

(I) "MEMBRANE MODULE" means the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

(B) Challenge testing must be conducted using one of the following challenge particulates: *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts.

(C) The concentration of the challenge particulate 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.

(D) 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:

Maximum Feed Concentration = $3.16 \times 10^{6} \times$ (Filtrate Detection Limit)

(E) 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.

(I) "FLUX" means the throughput of a pressure driven membrane process expressed as flow per unit of membrane area.

(II) "RECOVERY" means 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).

(F) Removal efficiency ($LRV_{C\text{-}Test}$) of each membrane module tested must be determined from the results of the challenge test and expressed in terms of log removal value using the following equation:

$LRV_{C\text{-}Test} = LOG_{10}(C_f) \times LOG_{10}(C_p)$

Where:

$LRV_{C\text{-}Test}$ = 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.

(I) The same units must be used for the feed and filtrate concentrations.

(II) If the challenge particulate is not detected in the filtrate, the term Cp is set equal to the detection limit.

(G) If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the calculated LRVs for the modules tested.

(H) If 20 or more modules are tested, then $LRV_{C\text{-}Test}$ is equal to the 10^{th} percentile of the calculated LRVs for the modules tested.

(I) 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 10^{th} percentile may be calculated using linear interpolation.

(I) 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 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.

(I) Production membrane modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.

(J) The supplier must submit the results of challenge testing.

(K) If a membrane is challenge tested and the filter is later 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, challenge testing must be conducted to demonstrate the removal efficiency and to determine a new QCRV for the modified membrane and the supplier must submit the results to the Department.

(iii) The supplier must conduct direct integrity tests according to the following criteria to demonstrate if the removal efficiency is greater than or equal to the removal credit received for the membrane filtration process:

(A) "DIRECT INTEGRITY TEST" means a physical test applied to a membrane unit in order to identify and isolate integrity breaches (i.e., leaks that could result in contamination of the filtrate).

(B) The direct integrity test must be independently applied to each membrane unit in service.

(I) "MEMBRANE UNIT" means 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.

(C) The direct integrity test method must have a resolution of three micrometers or less.

(I) "RESOLUTION" means the size of the smallest integrity breach that contributes to a response from the direct integrity test.

(D) The direct integrity test must have a sensitivity sufficient to verify the log treatment credit received for the membrane filtration process.

(I) "SENSITIVITY" means the maximum log removal value that can be reliably verified by a direct integrity test.

(E) Sensitivity must be determined using one of the following approaches based on the type of direct integrity test the supplier uses.

(I) For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity (LRV_{DIT}) must be calculated using the following equation:

$$LRV_{DIT} = LOG_{10} (Q_p /(VCF \times Q_{breach}))$$

Where:

LRV_{DIT} = 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 (LRV_{DIT}) must be calculated using the following equation:

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

Where:

LRV_{DIT} = 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.

(F) The supplier must establish a control limit within the sensitivity limits of the direct integrity test that indicates that an integral membrane unit is capable of meeting the removal credit received.

(G) If the result of a direct integrity test exceeds the control limit established above in 11.10(5)(j)(iii)(F), the supplier must remove the membrane unit from service.

(I) The supplier 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.

(H) The supplier must conduct direct integrity testing on each membrane unit at least once on each day the membrane unit is in operation.

(I) The Department may approve less frequent testing based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium* , or reliable process safeguards.

(iv) The supplier must conduct continuous indirect integrity monitoring on each membrane unit according to the following criteria:

(A) "INDIRECT INTEGRITY MONITORING" means monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter.

(B) The supplier must conduct continuous indirect integrity monitoring of filtrate turbidity monitoring, unless the Department approves an alternative parameter.

(C) The supplier must collect continuous indirect integrity monitoring samples at least every 15 minutes.

(D) The supplier must conduct continuous indirect integrity monitoring separately for each membrane unit.

(E) If indirect integrity monitoring results for turbidity are greater than (>) 0.15 NTU in two consecutive readings collected 15 minutes apart, the supplier must conduct direct integrity testing immediately, as specified in 11.10(5)(j)(iii), on the membrane unit where the exceedance occurred.

(F) If indirect integrity monitoring for a Department-approved alternative parameter does not meet a Department-approved control limit for a period of 15 minutes or more, the supplier must conduct direct integrity testing immediately, as specified in 11.10(5)(j)(iii), on the membrane unit that did not meet the control limit.

(G) The supplier must submit a monthly report that summarizes all continuous indirect integrity monitoring results that triggered direct integrity testing and the corrective action that was taken in each case.

(H) If the supplier conducts direct integrity testing of membrane units continuously in accordance with the criteria specified in 11.10(5)(j)(iii), the supplier is not required to comply with the continuous indirect integrity monitoring requirements.

(k) Second Stage Filtration

(i) The supplier receives 0.5-log *Cryptosporidium* treatment credit for a second stage of filtration that consists of sand, dual media, granular activated carbon (GAC), or other fine grain media following granular media filtration.

(ii) To be eligible for this credit:

(A) The first stage of filtration must be preceded by a coagulation step.

(B) Both filtration stages must treat the entire plant flow coming from the surface water source(s).

(C) The Department must approve the treatment credit based on an assessment of the design characteristics of the filtration process.

(iii) A cap, such as GAC, on a single stage of filtration is not eligible for this credit.

(l) Slow Sand Filtration as a Second Stage of Filtration

(i) The supplier receives 2.5-log *Cryptosporidium* treatment credit for a slow sand filtration process that follows a separate stage of filtration if:

(A) Both filtration stages treat entire plant flow coming from the surface water source(s);

(B) No disinfectant residual is present in the influent water to the slow sand filtration process; and

(C) The Department approves the treatment credit based on an assessment of the design characteristics of the filtration process.

(m) Ozone and Chlorine Dioxide

(i) The supplier receives the *Cryptosporidium* treatment credit for chlorine dioxide and/or ozone based on daily CT calculations where C and T are monitored during peak hourly flow.

(A) CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in mg/L).

(B) For systems with multiple disinfection segments in sequence, the supplier may calculate CT for each segment and add the *Cryptosporidium* CT values for each sequential segment of treatment to determine the total CT for the treatment plant.

(ii) For systems using chlorine dioxide treatment, the supplier must calculate daily chlorine dioxide CT values as specified above in 11.10(5)(m)(i) and use Table 11.10-VI to determine the *Cryptosporidium* treatment log credit achieved by the chlorine dioxide treatment for the applicable water temperature.

TABLE 11.10-VI CT VALUES (MG-MIN/L) FOR *CRYPTOSPORIDIUM* INACTIVATION BY CHLORINE DIOXIDE [1]

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

1 The supplier may use the following equation to determine log credit between the values in the table: Log credit = (0.001506 x (1.09116) Temp) x CT.

(iii) For systems using ozone treatment, the supplier must calculate daily ozone CT values as specified in 11.10(5)(m)(i) and use Table 11.10-VII to determine the *Cryptosporidium* treatment log credit achieved by the ozone treatment for the applicable water temperature.

TABLE 11.10-VII CT VALUES (MG-MIN/L) FOR *CRYPTOSPORIDIUM* INACTIVATION BY OZONE [1]

Log credit	Water temperature, °C	Water temperature, °C	Water temperature, °C	Water temperature, °C	Water temperature, °C	Water temperature, °C	Water temperature, °C	Water temperature, °C	Water temperature, °C	Water temperature, °C	Water temperature, °C
	≤0.5	**1**	**2**	**3**	**5**	**7**	**10**	**15**	**20**	**25**	**30**
0.25	6.0	5.8	5.2	4.8	4.0	3.3	2.5	1.6	1.0	0.6	0.39
0.5	12	12	10	9.5	7.9	6.5	4.9	3.1	2.0	1.2	0.78
1.0	24	23	21	19	16	13	9.9	6.2	3.9	2.5	1.6

1.5	36	35	31	29	24	20	15	9.3	5.9	3.7	2.4
2.0	48	46	42	38	32	26	20	12	7.8	4.9	3.1
2.5	60	58	52	48	40	33	25	16	9.8	6.2	3.9
3.0	72	69	63	57	47	39	30	19	12	7.4	4.7

1 The supplier may use the following equation to determine log credit between the values in the table: Log credit = (0.0397 x (1.09757)Temp) x CT.

(n) Ultraviolet Light

(i) The supplier receives the *Cryptosporidium* treatment credit in Table 11.10-VIII for ultraviolet light (UV) reactors by achieving the corresponding UV dose values in Table 11.10-VIII if:

(A) The supplier applies the UV treatment after filtration.

(B) The supplier uses a low pressure mercury vapor lamp that produces UV light at a wavelength of 254 nm.

(I) To receive treatment credit for other lamp types, the supplier must demonstrate an equivalent germicidal dose through reactor validation testing, as specified in 11.10(5)(n)(i)(C).

(C) The supplier uses UV reactors that have undergone validation testing to determine the validated operating conditions under which the reactor delivers the UV dose required Table 11.10-VIII.

(I) Validation testing must include the following:

(a) Full scale testing of a reactor that represents the UV reactors used by the system; and

(b) Inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

(II) The validated operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status.

(III) When determining validated operating conditions, the supplier must account for the following factors:

(a) UV absorbance of the water;

(b) Lamp fouling and aging;

(c) Measurement uncertainty of on-line sensors;

(d) UV dose distributions arising from the velocity profiles through the reactor;

(e) Failure of UV lamps or other critical system components; and

(f) Inlet and outlet piping or channel configurations of the UV reactor.

(D) At least 95 percent of the water supplied to the public during each month is treated by a UV reactor within validated operating conditions for the required UV dose.

(E) The supplier monitors the UV reactor(s) to determine if the treatment meets the criteria in 11.10(5)(n)(i)(C). UV reactor monitoring must include:

(I) UV intensity as measured by a UV sensor;

(a) The supplier must verify the calibration of UV sensors and must recalibrate sensors in accordance with a Department-approved protocol.

(II) Flow rate;

(III) Lamp status; and

(IV) Other parameters the Department designates based on UV reactor operation.

TABLE 11.10-VIII UV DOSE TABLE FOR *CRYPTOSPORIDIUM* INACTIVATION CREDIT

Log credit	*Cryptosporidium* UV dose (mJ/cm^2)
0.5	1.6
1.0	2.5
1.5	3.9
2.0	5.8
2.5	8.5
3.0	12
3.5	15
4.0	22

(o) Demonstration of Performance

(i) If approved by the Department, the supplier may receive *Cryptosporidium* treatment credit for treatment processes based on a demonstration of performance study that meets the criteria of this section, 11.10(5)(o). The treatment credit awarded may be greater than or less than the treatment credits specified in the Microbial Toolbox in 11.10(5)(b) through 11.10(5)(m) and may be awarded to treatment processes that do not meet the criteria specified in the Microbial Toolbox.

(A) If the supplier receives treatment credit for a treatment process included in the Microbial Toolbox through this demonstration of performance, the supplier cannot also receive the treatment credit for the Microbial Toolbox option specified in Table 11.10-V and 11.10(5)(b) through 11.10(5)(m).

(B) The supplier must complete the demonstration of performance study according to a Department-approved protocol and must demonstrate the level of *Cryptosporidium* reduction the treatment process will achieve under the full range of expected system operating conditions.

(C) The supplier must receive Department-approval in writing and the approval may require the supplier to conduct monitoring and demonstrate compliance with treatment performance criteria and submit the results to remain eligible for the treatment credit.

(I) The Department may specify treatment performance criteria to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

(p) Microbial Toolbox Reporting Requirements

(i) The supplier must submit the information in Table 11.10-IX for any Microbial Toolbox options used to comply with the additional *Cryptosporidium* treatment requirements.

(A) The Department may approve the supplier to certify operation within required parameters for the additional *Cryptosporidium* treatment credit rather than reporting monthly operational data for Microbial Toolbox options.

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11.11 GROUNDWATER RULE

11.11(1) General Applicability and Definitions

(a) For all groundwater systems, the supplier must comply with the requirements specified in this rule.

(i) For the purposes of this rule, a "GROUNDWATER SYSTEM" means any public water system that meets one or more of the following criteria:

(A) The system only uses groundwater sources.

(B) The system uses both surface water and groundwater sources and does not combine the groundwater sources and surface water sources before treatment.

(I) This rule only applies to the groundwater sources.

(II) Systems that combine groundwater sources with surface water sources before treatment are not considered groundwater systems.

(C) The system is a consecutive system that receives finished water from a groundwater system.

(b) "DETECTABLE" means at or above the detection limit of the approved methods specified in 11.46(8)(b).

11.11(2) Minimum Disinfection Treatment Requirements

(a) Applicability for Minimum Disinfection Treatment Requirements

(i) The supplier must comply with the requirements specified in this section, 11.11(2), unless one or more of the following conditions apply:

(A) The groundwater system is operating under a disinfection waiver and the supplier is required to comply with 11.13.

(B) The groundwater system has only hand-pumped wells and the supplier is required to comply with 11.12.

(C) The groundwater system has hand-pumped wells and other sources and the supplier is required to comply with this section, 11.11(2), for the groundwater sources that are not hand-pumped wells and with 11.12 for the groundwater sources that are hand-pumped wells.

(D) The groundwater system is a consecutive system that only supplies finished groundwater received from a wholesale system and therefore supplier is required to comply with 11.11(2)(b)(i)(B)(II), 11.11(2)(c)(i)(B), 11.11(2)(c)(i)(C), 11.11(2)(d)(i)(B), and 11.11(2)(e)(ii).

(b) Treatment Technique Requirements for Minimum Disinfection Treatment

(i) The minimum disinfection treatment technique requirements are as follows:

(A) When a groundwater source is used to supply water to the public, the supplier must disinfect the water using a chemical treatment method.

(B) When a groundwater source is used to supply water to the public, the supplier must maintain a residual disinfectant concentration at each entry point and throughout the distribution system.

(I) At each entry point, the residual disinfectant concentration must be greater than or equal to (≥) 0.2 mg/L.

(II) In the distribution system, the residual disinfectant concentration must be detectable throughout the distribution system.

(c) Monitoring Requirements for Minimum Disinfection Treatment Technique Requirements

(i) To determine compliance with the minimum disinfection treatment technique requirements, the supplier must monitor the residual disinfectant concentration.

(A) At each entry point, the supplier must monitor the residual disinfectant concentration at least once each week that water is supplied to the public from that entry point.

(I) If any entry point residual disinfectant concentration result is less than (<) 0.2 mg/L, the supplier must increase the residual disinfectant concentration monitoring frequency at that entry point to at least once every 24 hours from the time of discovery until the residual disinfectant concentration is greater than or equal to (≥) 0.2 mg/L.

(B) In the distribution system, the supplier must, at a minimum, monitor the residual disinfectant concentration at the same time and at the same sampling locations as the total coliform samples collected under 11.17(3).

(C) The supplier must measure the residual disinfectant concentration as free chlorine unless the supplier uses a disinfection process that results in a monochloramine residual disinfectant, then the supplier must measure the residual disinfectant concentration as total chlorine.

(d) Treatment Technique Violations for the Minimum Disinfection Treatment Requirements

(i) The following constitute disinfection treatment technique violations:

(A) At any entry point, the residual disinfectant concentration is less than (<) 0.2 mg/L for more than 72 hours after the time of discovery.

(B) In the distribution system, the residual disinfectant concentration is not detectable in more than 5 percent of the samples collected each monitoring period (i.e., month or quarter), for two consecutive monitoring periods during which the supplier supplies water to the public.

(e) Response to Treatment Technique Violations for the Minimum Disinfection Treatment Requirements

(i) In the event of an entry point treatment technique violation as specified in 11.11(2)(d)(i)(A), the supplier must:

(A) Notify the Department as soon as possible but no later than the end of the next business day.

(B) Determine and resolve the failure that resulted in the treatment technique violation.

(C) No later than 48 hours after the resolution of the failure, document all of the following:

(I) The date, time and duration of the failure.

(II) The cause of the failure.

(III) The steps taken to correct the failure.

(IV) What steps will be taken to prevent future failures.

(D) Submit the documentation specified above in 11.11(2)(e)(i)(C) if required by the Department.

(E) Distribute Tier 2 public notice as specified in 11.33.

(ii) In the event of a distribution system treatment technique violation as specified in 11.11(2)(d)(i)(B), the supplier must:

(A) Notify the Department no later than 48 hours after the violation occurs.

(B) Distribute Tier 2 public notice as specified in 33.

11.11(3) Requirements for 4-Log Treatment of Viruses

(a) Applicability for 4-Log Treatment of Viruses

(i) For any new or existing groundwater source that is treated to at least 4-log treatment of viruses at the entry point, either by choice or because the supplier is required to as specified in 11.38(3)(a)(i)(D) or 11.11(6), the supplier must comply with the requirements specified in this section, 11.11(3).

(A) If the supplier is subject to the requirements specified in this section, 11.11(3), the

supplier is not required to meet the source water monitoring requirements specified in 11.11(4) and 11.11(5).

(b) Notification of 4-Log Treatment of Viruses

(i) The supplier must submit notification that the system is providing at least 4-log treatment of viruses at the entry point(s).

(A) The submission must include engineering, operational, or other information that the Department requests to evaluate the submission.

(c) Treatment Technique Requirements for 4-Log Treatment of Viruses

(i) The supplier may use one of the following to comply with the 4-log treatment of viruses treatment technique requirements, as approved by the Department:

(A) Chemical disinfection.

(B) Membrane filtration.

(C) Alternative treatment methods.

(ii) If the supplier uses chemical disinfection to comply with the 4-log treatment of viruses treatment technique requirements, the supplier must maintain the Department-approved residual disinfectant concentration at the Department-approved location(s) that represent treated water at the entry point.

(iii) If the supplier uses membrane filtration to comply with the 4-log treatment of viruses treatment technique requirements, the supplier must operate the membrane filtration process according to Department-specified requirements.

(A) The membrane must reliably achieve at least 4-log removal of viruses.

(I) The membrane must have an absolute molecular weight cut-off, or an alternative parameter that describes the exclusion characteristics of the membrane and demonstrates that the membrane can achieve 4-log removal of viruses.

(B) The integrity of the membrane must remain intact.

(iv) If the supplier uses a Department-approved alternative treatment method to comply with the 4-log treatment of viruses treatment technique requirements, the supplier must operate the alternative treatment according to Department-specified requirements.

(d) Monitoring Requirements for 4-Log Treatment of Viruses

(i) To determine compliance with the 4-log treatment of viruses treatment technique requirements, the supplier must:

(A) Begin monitoring no later than 30 days after placing the source in service.

(B) Monitor at the Department-approved location and/or according to the Department-specified requirements.

(ii) If the supplier uses chemical disinfection to comply with the 4-log treatment of viruses

treatment technique requirements, the supplier must also:

(A) For a system that supplies greater than (>) 3,300 people, continuously monitor the residual disinfectant concentration at the Department-approved location(s).

(I) If there is a failure in the continuous monitoring equipment, the supplier must monitor the residual disinfectant concentration by collecting grab samples every four hours until the continuous monitoring equipment is returned to service.

(a) The supplier must resume continuous residual disinfectant concentration monitoring no later than 14 days after the equipment failure.

(B) For a system that supplies less than or equal to (≤) 3,300 people, monitor the residual disinfectant concentration daily by collecting grab samples at the Department-approved location(s).

(I) The supplier must collect a daily grab sample during the hour of peak flow or at another time specified by the Department.

(II) If any daily grab sample result is less than (<) the Department-approved residual disinfectant concentration, the supplier must monitor the residual disinfectant concentration every four hours until it is greater than or equal to (≥) the Department-approved residual disinfectant concentration.

(III) Alternatively, the supplier may monitor continuously as specified in 11.11(3)(d)(ii)(A).

(C) When a groundwater source is used to supply water to the public, record the lowest residual disinfectant concentration monitored each day.

(iii) If the supplier uses membrane filtration to comply with the 4-log treatment of viruses treatment technique requirements, the supplier must monitor the membrane filtration process according to Department-specified requirements.

(iv) If the supplier uses a Department-approved alternative treatment method to comply with the 4-log treatment of viruses treatment technique requirements, the supplier must monitor according to Department-specified requirements.

(e) Treatment Technique Violation and Response for 4-Log Treatment of Viruses

(i) If the supplier fails to provide at least 4-log treatment of viruses at the Department-approved location and/or according to the Department-specified requirements and the failure is not corrected within four hours from the time of discovery, a 4-log treatment of viruses treatment technique violation occurs.

(ii) In the event of a 4-log treatment of viruses treatment technique violation, the supplier must:

(A) Notify the Department as soon as possible but no later than the end of the next business day.

(B) Distribute Tier 2 public notice as specified in 11.33.

(f) Discontinuing Monitoring for Compliance With 4-log Treatment of Viruses Requirements

(i) The supplier may submit a request to discontinue the monitoring requirements for 4-log treatment of viruses. If the Department determines that monitoring for a source is no longer necessary, the Department shall document the decision in writing and the supplier may discontinue monitoring that source as specified in 11.11(3)(d).

(A) If the supplier has received Department-approval to discontinue monitoring as specified in 11.11(3)(d), the supplier must continue monitoring the source water as specified in 11.11(4) and 11.11(5) and meet the minimum residual disinfectant concentration requirements specified in 11.11(2).

11.11(4) Triggered Source Water Monitoring

(a) Applicability for Triggered Source Water Monitoring

(i) The supplier must conduct triggered source water monitoring if:

(A) The supplier is notified that a sample collected under 11.17(3)(b) is total coliform-positive and the sample was not invalidated under 11.17(5); and

(B) The supplier does not provide at least 4-log treatment of viruses at the entry point for each groundwater source as specified in 11.11(3).

(ii) The supplier is not required to conduct triggered source water monitoring if either of the following conditions are met:

(A) The Department determines and documents in writing that the routine total coliform-positive sample was caused by a distribution system deficiency and not by the source water.

(B) The supplier collected the routine total coliform-positive sample at a location that meets Department criteria for distribution system conditions that will cause total coliform-positive sample results and therefore the total coliform-positive sample result was not caused by the source water.

(I) No later than 30 days after receiving the total coliform-positive sample result, the supplier must submit documentation that demonstrates the sample location met Department criteria.

(b) Monitoring Requirements for Triggered Source Water Monitoring

(i) The supplier must collect triggered source water monitoring samples no later than 24 hours after being notified of a total coliform-positive sample collected under 11.17(3)(b).

(A) If the supplier experiences circumstances beyond their control that prevent the supplier from collecting the source water samples, the Department may extend the 24-hour limit on a case-by-case basis.

(I) If the Department approves the extension, the Department shall specify how much time the supplier has to collect the source water samples.

(ii) The supplier must collect at least one triggered source water monitoring sample from each groundwater source that was in use at the time the total coliform-positive sample was collected. These samples must be collected at the well, before any treatment is applied.

(A) If the system's configuration does not allow for the supplier to sample at the well

itself, the Department may:

(I) Approve the collection of triggered source water monitoring samples at a location that represents the water quality of that well or a location after treatment; and/or

(II) Require that sampling equipment be installed at the well itself.

(B) For systems with more than one groundwater source, the Department may approve collection of the triggered source water monitoring samples from a representative groundwater source(s).

(I) The representative source(s) must supply water to the section of the distribution system where the total coliform-positive sample was collected.

(II) If required by the Department, the supplier must submit, for approval, a triggered source water monitoring plan to use a representative source(s).

(a) The triggered source water monitoring plan must identify which source(s) the supplier intends to use for representative sampling of groundwater sources. For each representative source identified, the supplier must identify each total coliform sampling location that the source represents in the system's sampling plan specified in 11.17(3)(a)(ii).

(C) For a groundwater system supplying less than or equal to (≤) 1,000 people that uses *E. coli* as a fecal indicator for triggered source water monitoring, the supplier may use a triggered source water monitoring sample to meet both the repeat sampling requirements specified in 11.17(3)(c) and the triggered source water monitoring requirements.

(iii) The supplier must have all groundwater source samples analyzed for the presence of one of the following fecal indicators: *E. coli* , enterococci, or coliphage.

(c) Additional Triggered Source Water Monitoring Requirements for Consecutive and Wholesale Systems

(i) For consecutive systems, the supplier responsible for the consecutive system must notify all of their wholesalers of a total coliform-positive sample result collected under 11.17(3)(b), no later than 24 hours after being notified of the sample result.

(ii) For wholesale systems, the wholesaler must sample the groundwater source(s) as specified above in 11.11(4)(b) no later than 24 hours after being notified by the supplier responsible for the consecutive system of their total coliform-positive sample result collected under 11.17(3)(b).

(d) Response to Triggered Source Water Monitoring Fecal Indicator-Positive Sample Results

(i) If the supplier has a fecal indicator-positive triggered source water monitoring sample result, that is not invalidated under 11.11(4)(e)(i), the supplier must:

(A) Notify the Department and initiate consultation no later than 24 hours after being notified of the fecal indicator-positive initial triggered source water monitoring sample result.

(B) Distribute Tier 1 public notice as specified in 11.33.

(I) For all consecutive systems supplied by the groundwater source that tested positive for a fecal indicator, the supplier responsible for the consecutive system must also distribute Tier 1 public notice as specified in 11.33.

(C) No later than 24 hours after being notified of the fecal indicator-positive triggered source water monitoring sample result, collect five confirmation samples from the same source unless the Department requires the supplier to implement corrective action as specified in 11.11(6).

(I) If one or more of the confirmation samples is fecal indicator-positive, the supplier must implement corrective action as specified in 11.11(6).

(D) For a wholesale system, notify all consecutive systems that are supplied by that source of the original fecal indicator-positive sample result no later than 24 hours after being notified of the sample result.

(e) Sample Invalidation for Triggered Source Water Monitoring

(i) At the supplier's request, the Department may invalidate a fecal indicator-positive triggered source water monitoring sample based on one of the following conditions:

(A) The supplier submits written notice from the laboratory that improper sample analysis occurred.

(B) The Department determines and documents in writing that there is substantial evidence that the fecal indicator-positive triggered source water monitoring sample result is not related to source water quality.

(ii) If the Department invalidates a fecal indicator-positive triggered source water monitoring sample result, the supplier must collect a replacement source water sample no later than 24 hours after being notified by the Department of the invalidation.

(A) The replacement sample must meet all triggered source water monitoring requirements specified in 11.11(4). Additionally, the replacement sample must be analyzed by the laboratory for the same fecal indicator as the invalidated source sample.

(B) If the supplier experiences circumstances beyond their control that prevent the supplier from collecting the source water sample(s), the Department may extend the 24-hour limit on a case-by-case basis.

(I) If the Department approves the extension, the Department shall specify how much time the supplier has to collect the replacement source water samples.

11.11(5) Assessment Source Water Monitoring

(a) Applicability for Assessment Source Water Monitoring

(i) If required by the Department, the supplier must comply with the assessment source water monitoring requirements specified in this section, 11.11(5).

(A) To determine if assessment source water monitoring shall be required, the

Department may request that the supplier provide information that will enable the Department to complete a hydrogeologic sensitivity assessment.

(I) "HYDROGEOLOGIC SENSITIVITY ASSESSMENT" means a determination of whether a groundwater system obtains water from hydrogeologically sensitive settings. The following describe sensitive settings that can increase the risk of fecal contamination:

(a) Aquifers that exist in an area with high population densities combined with onsite wastewater treatment systems.

(b) Aquifers in which viruses may travel faster and further than bacteria (e.g. alluvial or sand aquifers).

(c) Shallow, unconfined aquifers.

(d) Aquifers with thin or absent soil cover.

(e) Areas where wells have previously been identified as having fecal contamination.

(f) Sensitive aquifers.

(ii) For new sources, the Department may require the supplier to begin assessment source water monitoring before the new source supplies water to the public.

(b) Monitoring Requirements for Assessment Source Water Monitoring

(i) Department-determined assessment source water monitoring requirements may include, but are not limited to:

(A) Collection of a groundwater source sample(s) each month the system supplies water to the public for a total of at least 12 samples for each groundwater source.

(B) Collection of groundwater source samples from each well unless the supplier obtains written Department approval to conduct representative sampling.

(I) "REPRESENTATIVE SAMPLING" means samples are collected at one or more wells within the groundwater system that are representative of multiple wells used by that system because the wells draw water from the same hydrogeologic setting.

(C) Collection of groundwater source samples at a location before any treatment of the groundwater source, unless the Department approves a sampling location after treatment.

(D) Collection of groundwater source samples at the well itself unless the system's configuration does not allow for sampling at the well itself and the Department approves an alternative sampling location that is representative of the water quality of that well.

(E) Analysis of assessment source water monitoring samples for the presence of *E. coli,* enterococci, or coliphage.

(F) Collection of a standard sample volume of at least 100 ml for fecal indicator analysis

for assessment source water monitoring samples.

(ii) If the supplier is required to conduct assessment source water monitoring, the supplier may use triggered source water monitoring samples collected under 11.11(4) to meet the requirements of assessment source water monitoring.

(c) Response to Assessment Source Water Monitoring Fecal Indicator-Positive Sample Results

(i) If an assessment source water monitoring sample result is fecal indicator-positive, the supplier must:

(A) Distribute Tier 1 public notice as specified in 11.33.

(I) For all consecutive systems supplied by the groundwater source that tested positive for a fecal indicator, the supplier responsible for the consecutive system must also comply with this public notification requirement.

(B) If required by the Department, implement corrective action as specified in 11.11(6).

11.11(6) Corrective Action for Source Water Fecal Indicator-Positive Monitoring Results

(a) Applicability

(i) The supplier must comply with the requirements specified in this section, 11.11(6), if:

(A) A confirmation triggered source water monitoring sample result collected under 11.11(4)(d)(i)(C) is fecal indicator-positive; or

(B) The supplier is required to by the Department after either:

(I) A fecal indicator-positive initial triggered source water monitoring sample collected under 11.11(4)(b)(i-ii) or 11.11(4)(c)(ii); or

(II) A fecal indicator-positive assessment source water monitoring sample collected under 11.11(5)(b).

(b) Corrective Action Requirements

(i) The supplier must implement one or more of the following corrective actions:

(A) Correct all significant deficiencies.

(B) Provide an alternative source of water.

(C) Eliminate the source of contamination.

(D) Provide treatment that reliably achieves at least 4-log treatment of viruses at the Department-approved location for the groundwater source.

(ii) The Department may specify interim measures at any time pending completion of corrective action to protect public health.

(iii) No later than 30 days after receiving written notice from a laboratory of a fecal indicator-positive confirmation triggered source water monitoring sample result collected under 11.11(4)(d)(i)(C) or receiving direction from the Department to complete corrective action

as specified in 11.11(6)(a)(i)(B), the supplier must consult with the Department regarding the appropriate corrective action, unless the Department specifies which corrective action the supplier must implement.

(iv) No later than 45 days after receiving written notice from a laboratory of a fecal indicator-positive confirmation triggered source water monitoring sample result collected under 11.11(4)(d)(i)(C) or receiving direction from the Department to complete corrective action as specified in 11.11(6)(a)(i)(B), the supplier must submit a corrective action plan for approval.

(A) The corrective action plan must include the actions the supplier will take to address the fecal indicator-positive groundwater source sample(s) and a proposed schedule for completing the actions.

(v) Any changes the supplier makes to a Department-approved corrective action plan and schedule must be approved by the Department.

(vi) No later than 120 days, or earlier if required by the Department, after receiving written notice from a laboratory of a fecal indicator-positive confirmation triggered source water monitoring sample result collected under 11.11(4)(d)(i)(C) or receiving direction from the Department to complete corrective action as specified in 11.11(6)(a)(i)(B), the supplier must either:

(A) Have completed the Department-approved corrective action plan including any Department-specified interim measures; or

(B) Be in compliance with a Department-approved corrective action plan and schedule including any Department-specified interim measures.

(vii) No later than 30 days after completing any corrective action under 11.11(6)(b), the supplier must notify the Department of the completed corrective action.

(c) Treatment Technique Violation and Response for Corrective Action

(i) If the supplier fails to comply with the requirements specified in 11.11(6)(b), a corrective action treatment technique violation occurs.

(ii) In the event of a corrective action treatment technique violation, the supplier must:

(A) Notify the Department no later than 48 hours after the violation occurs.

(B) Distribute Tier 2 public notice as specified in 11.33.

11.12 GROUNDWATER RULE: HAND-PUMPED WELLS

11.12(1) Applicability for Hand-Pumped Wells

For groundwater systems with hand-pumped wells, the supplier must comply with the requirements specified in this rule unless otherwise determined by the Department.

(a) Only suppliers of transient non-community groundwater systems may operate hand-pumped wells.

11.12(2) Operating Requirements for Hand-Pumped Wells

(a) The supplier must operate and maintain hand-pumped wells in accordance with Department-

approved hand-pumped well monitoring and operational criteria.

(i) The supplier must either submit criteria for Department approval or use the pre-approved criteria in the Department's Monitoring and Operational Guidance Handbook for Colorado Public Water Systems Utilizing Hand-Pumped Wells Which Do Not Provide Continuous Disinfection.

(b) The supplier must distribute a special public notice for hand-pumped wells.

(i) The supplier must post the special public notice on or within sight of the hand-pumped well whenever the well has the potential to supply water to the public.

(ii) The special public notice must include the following language and provide the specific information for the text in brackets:

(A) This hand pump serves unchlorinated well water. For more information, please contact [phone number of public water system owner, operator, or designee of the public water system].

(iii) The supplier must comply with the public notice requirements specified in 11.33(5)(e-f).

(c) For seasonally operated hand-pumped wells, the supplier must disinfect the well(s) no earlier than 30 days before opening for the season.

(d) For hand-pumped wells operated year-round, the supplier must disinfect the well(s) at least annually during the busiest month of operation.

11.12(3) Response to Hand-Pumped Well Sample Results

(a) If the result of any routine total coliform sample is positive for fecal coliforms or *E. coli* or a repeat total coliform sample is positive for total coliform, the supplier must:

(i) Close the hand-pumped well until a total coliform sample is absent of bacteria.

(ii) Disinfect the hand-pumped well before resuming operation.

11.13 GROUNDWATER RULE: DISINFECTION WAIVERS

11.13(1) Applicability for Disinfection Waivers

(a) The Department shall not approve new disinfection waivers.

(b) If the system has an existing disinfection waiver, the supplier must comply with the requirements specified in this rule.

(i) The supplier is not required to comply with the minimum residual disinfectant concentration requirements specified in 11.11(2).

11.13(2) Requirements for Maintaining a Disinfection Waiver

To maintain a disinfection waiver, the supplier must:

(a) Only supply water from groundwater sources.

(b) Distribute a special public notice regarding the disinfection waiver.

(i) For community water systems, the supplier must distribute the special public notice annually to inform consumers of the disinfection waiver.

(A) The supplier may use the consumer confidence report required under 11.34 to satisfy this requirement.

(ii) For non-community water systems, the supplier must continuously post the special public notice in conspicuous locations.

(iii) The special public notice must include the following language and provide the specific information for the text in brackets:

(A) [Name of groundwater system] has a waiver from disinfection requirements and serves well water that has not been chlorinated.

(iv) The supplier must comply with the public notice requirements specified in 11.33(5)(e-f).

(v) The Department may require the supplier to distribute the special public notice to new billing units or new customers as specified in 11.33(6)(b).

(c) Have the ability to provide a residual disinfectant concentration for the groundwater system in an emergency.

(i) The supplier must have Department-approved emergency disinfection equipment or be operating in accordance with the Department-approved emergency operating plan.

(d) Have a Department-approved monitoring plan that meets the requirements specified in 11.5.

(i) The supplier must operate in accordance with the Department-approved monitoring plan.

(e) Have a Department-approved distribution system protection plan.

(i) The supplier must operate in accordance with the Department-approved distribution system protection plan.

(ii) At a minimum, the distribution system protection plan must include all of the following:

(A) A description of protection measures designed to reduce public health risks for water provided through storage and the distribution system.

(B) A description of distribution system operation and maintenance practices (e.g., flushing schedules, scheduled upgrades, disinfection schedules);

(C) A description of a cross-connection control program that meets the requirements specified in 11.37.

(D) Identification of each potential point of entry for hazards and/or contaminants into the storage and distribution system and a description of the hazard and/or contaminant control measures to be used to mitigate the potential public health risks.

(E) A description of monitoring locations and parameters that will be used to verify and document that the hazard and/or contaminant control measures are effective.

(F) A description of incident response procedures to be followed in the case of a

distribution system breach, hazard condition and/or contamination event. The procedure must at least include confirmation and repeat sampling protocols and flushing procedures.

(f) Have a Department-approved source water protection plan.

(i) The supplier must operate in accordance with the Department-approved source water protection plan.

(ii) At a minimum, the source water protection plan must include all of the following:

(A) A description of protection measures designed to reduce public health risks for water provided from groundwater sources.

(B) Delineation of source water protection areas.

(C) An inventory of potential sources of contamination.

(D) A plan for management of potential sources of contamination.

(E) Well failure emergency and contingency plans.

(F) Capacity development plan for new wells.

(G) A description of the methods to be used to involve and educate the public during the source water protection planning and implementation process.

(g) Keep records of chlorination activities as specified in 11.36(4)(c)(i)(C).

11.13(3) Disinfection Waiver Health-based Evaluations

(a) The Department may evaluate a groundwater system's wells and storage systems to determine if there are potential health risks from these sources. The Department shall conduct the evaluation based on criteria found in:

(i) Well construction and location criteria outlined in the rules, regulations, and Colorado statutes governing water well construction as enforced by the State Board of Examiners of Water Well and Pump Installation Contractors.

(ii) The State of Colorado Design Criteria for Potable Water Systems or other criteria developed by the Department.

(b) For new or existing sources, the Department may require assessment source water monitoring as specified in 11.11(5), additional testing, and additional information to establish that the water being supplied to the public is from a groundwater source determined to be free from microbial contamination.

(i) For new sources, the Department may require that all testing and evaluation be completed before the source may be used to supply water to the public.

(c) The Department may, at any time, conduct a full or partial sanitary survey to establish that the groundwater system is at low risk for contamination.

11.13(4) Disinfection Waiver Withdrawal

(a) A disinfection waiver may be withdrawn immediately if:

(i) The supplier fails to correct significant deficiencies as specified in 11.38(3).

(ii) The supplier fails to comply with 11.17 Total Coliform Rule.

(iii) The supplier fails to comply with the triggered source water monitoring and reporting requirements specified in 11.11(4).

(iv) The supplier fails to comply with 11.37 Cross-Connection Control Rule.

(v) There is an incidence of microbial disease, the source of which is reasonably identified by the Department as originating from consumption of drinking water from the groundwater system.

(vi) There is an occurrence of unforeseeable situations or conditions which are reasonably identified by the Department as having the potential to contribute to a microbial disease incident.

(vii) The supplier fails to have the system operated by qualified personnel who meet the requirements of Regulation 100, Water and Wastewater Facility Operators Certification Requirements, and are included in a State register of qualified operators.

(viii) The groundwater system is in violation of the *Colorado Primary Drinking Water Regulations* .

(ix) The groundwater system is not in compliance with all disinfection waiver requirements specified in 11.13(2), or if based on other information obtained, it appears that the water being supplied to the public presents a potential risk to public health.

(b) If the groundwater system has a source that has been determined by the Department to be fecally contaminated or is required to comply with the 4-log treatment of viruses requirements specified in 11.11(3), the waiver shall be withdrawn immediately.

11.13(5) Response to a Disinfection Waiver Withdrawal

(a) If the Department withdraws the disinfection waiver, the supplier must disinfect the groundwater and comply with the minimum disinfectant residual concentration requirements as specified in 11.11(2).

(b) The supplier may request a hearing to contest the withdrawal of the waiver. The request for such a hearing must be filed in writing no later than 60 days after service of the Department's withdrawal. The hearing must be conducted under the procedures established by Article 4 of Title 24, Colorado Revised Statutes.

11.14 RESERVED

11.15 RESERVED

11.16 RESERVED

11.17 TOTAL COLIFORM RULE

11.17(1) Applicability and Definitions

(a) For all public water systems, the supplier must comply with the requirements specified in this rule.

(b) "CONFLUENT GROWTH" means, in the context of bacterial testing, a continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion thereof, in which bacterial colonies are not discrete.

(c) "TOO NUMEROUS TO COUNT" means that the total number of bacterial colonies exceeds 200 on a 47-millimeter (mm) diameter membrane filter used for coliform detection.

11.17(2) MCLs for Microbial Contaminants

(a) The microbial contaminant MCLs are as follows:

TABLE 11.17-I MCLs FOR MICROBIAL CONTAMINANTS

Contaminant	Total number of samples collected	MCL
Total coliforms	The supplier collects less than (<) 40 samples per month	No more than one sample collected during a month is total coliform-positive
Total coliforms	The supplier collects greater than or equal to (≥) 40 samples per month	No more than 5.0 percent of all the samples collected during a month are total coliform-positive
Fecal coliform or *E. coli* repeat sample		Absent
Total coliform-positive repeat sample following a fecal coliform-positive or *E. coli* -positive routine sample		Absent

(b) The BATs for achieving compliance with the MCLs for microbial contaminants are specified in 40 CFR 141.63(e) as amended July 1, 2013.

11.17(3) Sampling Requirements for Total Coliform

(a) General Sampling Requirements for Total Coliform

(i) To determine compliance with the MCL for microbial contaminants, the supplier must collect total coliform samples at locations that are representative of water throughout the distribution system and at regular time intervals throughout the month.

(A) For groundwater systems that supply less than or equal to (≤) 4,900 people, the supplier may collect all required samples on a single day if the samples are collected from different locations.

(ii) The supplier must maintain a written individual rule sampling plan identifying the total coliform sample locations as part of the monitoring plan as specified in 11.5.

(A) The Department may review the individual rule sampling plan and revise it as

necessary.

(b) Routine Sampling Requirements for Total Coliform

(i) The supplier must collect the number of routine total coliform samples specified in Table 11.17-II each month, except:

(A) For non-community water systems using only groundwater sources that supply less than or equal to (≤) 1,000 people, the supplier must collect one total coliform sample during each quarter that water is supplied to the public.

(I) If the system is reclassified as a surface water system, the supplier must collect the number of total coliform samples specified in Table 11.17-II each month beginning with the month following written Department-determination of the reclassification.

TABLE 11.17-II NUMBER OF ROUTINE TOTAL COLIFORM SAMPLES REQUIRED PER MONITORING PERIOD

Population supplied	Minimum number of samples required	Population supplied	Minimum number of samples required
25 to 1,000 [1]	1	59,001 to 70,000	70
1,001 to 2,500	2	70,001 to 83,000	80
2,501 to 3,300	3	83,001 to 96,000	90
3,301 to 4,100	4	96,001 to 130,000	100
4,101 to 4,900	5	130,001 to 220,000	120
4,901 to 5,800	6	220,001 to 320,000	150
5,801 to 6,700	7	320,001 to 450,000	180
6,701 to 7,600	8	450,001 to 600,000	210
7,601 to 8,500	9	600,001 to 780,000	240
8,501 to 12,900	10	780,001 to 970,000	270
12,901 to 17,200	15	970,001 to 1,230,000	300
17,201 to 21,500	20	1,230,001 to 1,520,000	330
21,501 to 25,000	25	1,520,001 to 1,850,000	360
25,001 to 33,000	30	1,850,001 to 2,270,000	390
33,001 to 41,000	40	2,270,001 to 3,020,000	420
41,001 to 50,000	50	3,020,001 to 3,960,000	450
50,001 to 59,000	60	3,960,001 or more	480

1 Includes systems that have greater than or equal to (≥) 15 service connections, but supply less than (<) 25 people.

(ii) For a non-community water system that is not open year round, the supplier must collect a total coliform sample at least 10 days before opening for the season.

(iii) For hand-pumped wells, the supplier must collect a total coliform sample from the hand-pumped well each month that it supplies water to the public.

(iv) If the supplier collects special purpose samples (e.g., samples collected to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair), the Department will not consider these as routine samples and will not use the

sample results to determine compliance with the MCLs.

(c) Repeat Sampling Requirements for Total Coliform

(i) If a routine sample result is total coliform-positive, the supplier must collect a set of repeat samples no later than 24 hours after being notified of the positive sample result.

(A) If the supplier has a logistical problem beyond their control that prevents the supplier from collecting the repeat samples, the Department may extend the 24-hour limit on a case-by-case basis.

(I) The supplier must request the extension as soon as possible but no later than 24 hours after being notified of the positive sample result.

(II) If the Department approves the extension, the Department shall notify the supplier no later than the end of the next business day and specify how much time the supplier has to collect the repeat samples.

(ii) The supplier must collect repeat samples as follows:

(A) If the supplier is required to collect one routine total coliform sample each month or each quarter, the supplier must collect four repeat total coliform samples for each total coliform-positive sample result.

(B) If the supplier is required to collect more than one routine total coliform sample each month, the supplier must collect three repeat total coliform samples for each total coliform-positive sample result.

(iii) The supplier must collect repeat samples at the following locations:

(A) One total coliform sample at the tap where the original total coliform-positive sample was collected.

(B) One total coliform sample at a tap within five service connections upstream from the tap where the original total coliform-positive sample was collected.

(C) One total coliform sample at a tap within five service connections downstream from the tap where the original total coliform-positive sample was collected.

(D) If the supplier is required to collect four repeat samples, the supplier may choose where to collect the fourth repeat sample.

(E) If the supplier collected the original total coliform-positive sample from the end of the distribution system or one tap away from the end of the distribution system, the Department may waive the requirement to collect one repeat sample upstream or downstream of tap where the original total coliform-positive sample was collected and specify more appropriate sampling locations for collecting the repeat samples.

(iv) The supplier must collect all repeat samples on the same day.

(A) If the system has only one service connection, the Department may allow the supplier to collect the repeat samples over a four-day period.

(v) If one or more of the repeat sample results is total coliform-positive, the supplier must:

(A) Collect an additional repeat sample set as specified in 11.17(3)(c)(ii-iv) for each location that had a total coliform-positive sample result.

(I) The additional repeat sample set(s) must be collected no later than 24 hours after being notified of the total coliform-positive sample result(s), unless the Department extends the 24-hour limit as specified in 11.17(3)(c)(i)(A).

(B) Continue to collect repeat sample sets as specified in 11.17(3)(c)(v)(A) until either:

(I) Total coliforms are not detected in one complete repeat sample set; or

(II) The MCL for microbial contaminants has been exceeded and the supplier has notified the Department of the MCL exceedance.

(vi) If the supplier collects a routine sample, which after analysis is found to be total coliform-positive, but before receiving that sample result the supplier collects another routine sample within five service connections of the original sample, the supplier may use the subsequent routine sample as a repeat sample instead of as a routine sample.

(vii) Repeat samples are not considered special purpose samples and must be used to determine compliance with the MCL for microbial contaminants as specified in 11.17(8).

(viii) The Department shall not waive the requirement to collect repeat samples.

(d) <u>For Systems Supplying Less Than or Equal to (≤) 4,100 People – Monitoring Requirements Following a Total Coliform-positive Sample Result</u>

(i) If the supplier is collecting fewer than five routine samples each month and one or more of the samples collected is total coliform-positive, the supplier must collect five routine samples during the next month that the system supplies water to the public.

(A) The Department may waive the requirement to collect five routine samples the next month if one of the following conditions is met:

(I) The Department, or an agent approved by the Department, performs a site visit before the end of the next month that the system supplies water to the public.

(a) The site visit is not required to be a sanitary survey, but the site visit must be sufficiently detailed to allow the Department to determine whether additional monitoring and/or corrective action is needed.

(b) The Department will not approve an employee of the system to perform the site visit, even if the employee is an agent approved by the Department to perform sanitary surveys.

(II) The Department has determined the reason that the sample result was total coliform-positive and establishes that the supplier has corrected the problem or will correct the problem before the end of the next month that the system supplies water to the public.

(a) The Department must document the decision to waive the requirement in writing, have it approved and signed by a supervisor of the Department official who recommends the

decision, and make this document available to the EPA and the public. The written documentation must describe the specific cause of the total coliform-positive sample result and what action the supplier has taken and/or will take to correct this problem.

(b) The supplier must still collect the number of routine samples specified in Table 11.17-II before the end of the next month that the system supplies water to the public and use it to determine compliance with the MCL for microbial contaminants unless the Department determines that the supplier corrected the contamination problem before the supplier collected the set of repeat samples required under 11.17(3)(c)(i-v), and all repeat samples were total coliform-negative.

(B) The Department will not waive the requirement to collect five routine total coliform samples the next month based only on the fact that all repeat samples are total coliform-negative.

(ii) The supplier may return to collecting the routine number of total coliform samples specified in Table 11.17-II after the month in which five total coliform samples were required if all five samples were total coliform-negative.

11.17(4) Investigation of Total Coliform-Positive Routine Sample Results

(a) For each total coliform-positive sample result, after the supplier collects repeat samples, the supplier must investigate the cause of the total coliform-positive routine sample result(s).

(1) The investigation is to include information regarding the conditions at the source(s), treatment facility(s), storage facilities, and distribution system including an evaluation of the potential for unprotected cross connection(s).

(A) The supplier may modify the scope of the investigation to take into account conditions that are unique to the system's size, source(s), distribution system layout, and cross connection control devices relative to the location of the total coliform-positive sample result(s).

(b) The supplier must complete the investigation before the repeat sample results become available.

(c) The Department will use the information collected during the investigation in the event an acute MCL violation occurs.

11.17(5) Invalidation of Total Coliform Samples

(a) The Department may invalidate a total coliform-positive sample result if any of the following conditions are met:

(i) The laboratory determines that improper sample analysis caused the total coliform-positive sample result.

(ii) Based on the repeat sample results, the Department determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem.

(A) "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.

(B) The Department shall not invalidate a sample result on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected within five service connections of the original tap are total coliform-negative.

(iii) The Department has substantial grounds to believe that the total coliform-positive sample result was due to a circumstance or condition that does not reflect water quality in the distribution system.

(A) The Department shall document the decision and rationale for invalidating a total coliform-positive sample result in writing, have it approved and signed by a supervisor of the Department official who recommended the decision, and make this document available to the EPA and the public.

(I) The written documentation must state the specific cause of the total coliform-positive sample result, and what action the supplier has taken, or will take, to correct the problem.

(II) The Department will not invalidate a total coliform-positive sample result based only on the fact that all repeat sample results are total coliform-negative.

(B) If the Department makes this determination, the supplier must still collect the required number of repeat samples as specified in 11.17(3)(c)(i-v) and use them to determine compliance with the MCL for microbial contaminants.

(b) The laboratory must invalidate a total coliform-negative sample result if one or more of the following conditions are met:

(i) The sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the Multiple-Tube Fermentation Technique).

(ii) The sample produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P-A) Coliform Test.

(iii) The sample exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (i.e., Membrane Filter Technique).

(c) If the laboratory invalidates a total coliform sample result, the supplier must collect a replacement total coliform sample from the same location as the invalidated sample no later than 24 hours after being notified of the invalidation.

(i) If the supplier has a logistical problem beyond their control that prevents the supplier from collecting the replacement samples, the Department may extend the 24-hour limit on a case-by-case basis.

(A) If the Department approves the extension, the Department will specify how much time the supplier has to collect the replacement sample.

(ii) The supplier must continue to collect replacement samples until a valid result is obtained.

(d) If a total coliform-positive sample result is invalidated, the sample result will not count towards meeting the monitoring requirements as specified in this rule.

11.17(6) Sampling Requirements for Fecal Coliforms/Escherichia coli (E. coli)

(a) If any routine or repeat sample result is total coliform-positive, the supplier must have a laboratory certified by the state of Colorado analyze that total coliform-positive culture medium to determine if fecal coliforms or *E. coli* are present.

(b) If fecal coliforms or *E. coli* are present, the supplier must notify the Department no later than the end of the next business day after the day the supplier was notified of the sample result.

(c) On a case-by-case basis, the Department may allow the supplier to forgo fecal coliform or *E. coli* analysis on a total coliform-positive sample if the supplier assumes that the total coliform-positive sample result is fecal coliform-positive or *E. coli* -positive for the purposes of determining compliance with the MCL.

11.17(7) Analytical Requirements for Microbial Contaminants

(a) The supplier must collect total coliform samples that are 100 ml in volume, regardless of the analytical method used for total coliform analysis.

(b) The supplier is only required to determine the presence or absence of total coliforms; a determination of total coliform density is not required.

(c) If fecal coliform analysis is performed following a total coliform-positive sample result, the supplier is only required to determine the presence or absence of fecal coliforms; a determination of fecal coliform density is not required.

11.17(8) Compliance Determination for Microbial Contaminants

(a) Compliance with the MCL is based on the presence or absence of total coliforms and fecal coliforms or *E. coli* .

(b) The supplier must determine compliance with the MCL each month that total coliform samples are collected.

(c) The supplier must include the results of all routine and repeat samples collected in the month when determining compliance with the MCL.

(i) Sample results that are invalidated by the Department or the laboratory are not included in determining compliance.

11.17(9) Violations for Microbial Contaminant MCLs

(a) The following constitute acute MCL violations:

(i) A repeat sample is fecal coliform-positive or *E. coli* -positive.

(ii) A repeat sample is total coliform-positive following a fecal coliform-positive or *E. coli* -positive routine sample.

(b) The following constitute non-acute MCL violations:

(i) If the supplier collects less than (<) 40 samples per month, more than one sample collected

during a monitoring period is total coliform-positive.

(ii) If the supplier collects greater than or equal to (≥) 40 samples per month, more than 5.0 percent of all samples collected during a monitoring period are total coliform-positive.

11.17(10) Response to Violations for Microbial Contaminants

(a) In the event of an acute MCL violation or if the supplier fails to analyze a total-coliform positive sample for fecal coliforms or *E. coli* , the supplier must:

(i) Consult with the Department as soon as possible but no later than 24 hours after learning of the violation to determine the need for requiring the public to boil their water or use alternative sources of water.

(ii) Distribute Tier 1 public notice as specified in 11.33.

(b) In the event of a non-acute MCL violation, the supplier must:

(i) Notify the Department no later than the end of the next business day after the supplier learns of the violation; and

(ii) Distribute Tier 2 public notice as specified in 11.33.

(c) In the event of a monitoring and reporting violation for failure to submit the required number of repeat samples, the supplier may be required to distribute Tier 2 public notice as specified in 11.33.

(d) If the supplier fails to comply with a monitoring requirement specified in this rule, the supplier must:

(i) Notify the Department no later than ten days after the supplier learns of the violation.

(ii) Distribute Tier 3 public notice as specified in 11.33.

11.18 NITRATE AND NITRITE RULE

11.18(1) Applicability

For all public water systems, the supplier must comply with the requirements specified in this rule.

11.18(2) MCL Requirements for Nitrate and Nitrite

(a) The nitrate and nitrite MCLs are as follows:

TABLE 11.18-I NITRATE AND NITRITE CHEMICALS MCLs

Chemical	MCL (mg/L)
Nitrate	10 (as Nitrogen)
Nitrite	1 (as Nitrogen)
Total Nitrate and Nitrite	10 (as Nitrogen)

(b) The cited detection limits for nitrate and nitrite are specified in 40 CFR 141.23(a)(4)(i) as amended July 1, 2013.

(c) The BATs for achieving compliance with the MCLs for nitrate and nitrite are specified in 40 CFR 141.62(c) as amended July 1, 2013.

(d) Elevated MCL Requirements for Nitrate

(i) For non-community water systems, the Department may allow an elevated MCL of 20 mg/L for nitrate, if the supplier can demonstrate to the satisfaction of the Department that:

(A) Such water will not be available to children under 6 months of age; and

(B) It will not result in any adverse health effects.

(ii) If the Department allows an elevated MCL for nitrate, the supplier must:

(A) Continuously post public notice stating that nitrate levels are greater than (>) 10 mg/L and include the potential health effects of exposure.

(I) The supplier must distribute Tier 1 public notice as specified in 11.33.

(B) Notify local and State public health authorities annually of nitrate levels greater than (>) 10 mg/L.

11.18(3) Sampling Requirements for Nitrate and Nitrite

(a) General Sampling Requirements for Nitrate and Nitrite

(i) To determine compliance with the MCLs for nitrate and nitrite, the supplier must comply with the sampling requirements specified in this section, 11.18(3).

(ii) The supplier may apply to the Department to sample more frequently than required.

(iii) The Department may:

(A) Require the supplier to sample more frequently than the minimum requirements specified in 11.18(3)(b) or 11.18(3)(c).

(B) Require the supplier to collect a confirmation sample for any sample result.

(C) Invalidate sample results based on sampling or analytical errors.

(D) Specify when the supplier must sample during each monitoring period.

(iv) If the system draws water from more than one source and the sources are combined before distribution, the supplier must sample during periods of normal operating conditions.

(b) Sampling Requirements for Nitrate

(i) To determine compliance with the MCL for nitrate, the supplier must comply with the sampling requirements specified in this section, 11.18(3)(b).

(ii) For new systems or new sources, the supplier must begin sampling at a routine frequency when the new system or source begins supplying water to the public.

(iii) For routine sampling, the supplier must collect one sample at each entry point:

(A) For community and non-transient, non-community water systems:

(I) For surface water systems, quarterly.

(II) For groundwater systems, annually.

(B) For transient, non-community water systems, annually.

(iv) For community and non-transient, non-community water systems, if the supplier is sampling annually and any sample result is greater than or equal to (≥) 50 percent of the MCL, the supplier must increase the sampling frequency at that entry point to quarterly for at least one year.

(v) If the supplier is required to sample quarterly, the Department may allow the supplier to reduce the sampling frequency at that entry point to annually if the sample results from four consecutive quarters are:

(A) For groundwater systems, reliably and consistently below the MCL.

(B) For community and non-transient, non-community surface water systems, less than (<) 50 percent of the MCL.

(vi) If the Department allows the supplier to reduce the sampling frequency to annually, the supplier must sample during the quarter that previously had the highest sample result.

(vii) If any sample result is greater than (>) the MCL, the supplier must collect a confirmation sample at that entry point no later than 24 hours after being notified of the original sample result.

(A) If the supplier is unable to collect a confirmation sample within 24 hours, the supplier must:

(I) Distribute Tier 1 public notice as specified in 11.33 no later than 24 hours after being notified of the original sample result.

(II) Collect and analyze a confirmation sample no later than 14 days after being notified of the original sample result.

(viii) If the Department allows an elevated MCL for nitrate, the supplier must sample at a Department-specified frequency.

(A) If any sample result is greater than (>) the elevated MCL, the supplier must:

(I) Notify the Department no later than seven days after being notified of the original sample result.

(II) Collect three confirmation samples at the same entry point no later than one month after being notified of the original sample result.

(c) Sampling Requirements for Nitrite

(i) To determine compliance with the MCL for nitrite, the supplier must comply with the sampling requirements specified in this section, 11.18(3)(c).

(ii) For new systems or new sources, the supplier must collect an initial sample at each entry point within the first year of operation.

(iii) After collecting the initial sample, if the sample result is less than (<) 50 percent of the MCL, the supplier must sample at a routine frequency. For routine sampling, the supplier must

sample at that entry point once during each nine-year compliance cycle.

(iv) If any sample result is greater than or equal to (≥) 50 percent of the MCL, the supplier must increase the sampling frequency at that entry point to quarterly for at least one year.

(A) If the sample results are reliably and consistently below the MCL, the Department may allow the supplier to reduce the sampling frequency at that entry point to annually.

(I) If the Department allows the supplier to reduce the sampling frequency to annually, the supplier must sample during the quarter that previously had the highest sample result.

(v) If any sample result is greater than (>) the MCL, the supplier must collect a confirmation sample at that entry point no later than 24 hours after being notified of the original sample result.

(A) If the supplier is unable to collect a confirmation sample within 24 hours, the supplier must:

(I) Distribute Tier 1 public notice as specified in 11.33 no later than 24 hours after being notified of the original sample result.

(II) Collect and analyze a confirmation sample no later than 14 days after being notified of the original sample result.

(d) Sampling Requirements for Consecutive Systems with Their Own Additional Sources

(i) For consecutive systems, the Department may change the nitrate and nitrite sampling requirements if the system meets all of the following criteria:

(A) The purchased water enters the distribution system separate from any additional sources owned by the consecutive system.

(B) The interconnection of the systems justifies the modification of sampling requirements.

(ii) The supplier must comply with the Department-specified schedule.

11.18(4) Compliance Determination for Nitrate and Nitrite

Compliance with the MCL is based on the individual sample result, unless a confirmation sample is required.

(a) If a confirmation sample is required, compliance will be based on the average of the original sample result and the confirmation sample result.

(b) If a sample result is less than (<) the cited detection limit, the sample result will be given a value of zero to calculate the average.

(c) If the supplier fails to collect the required number of samples, compliance will be based on the available sample results.

(d) If the Department allows an elevated MCL for nitrate and confirmation samples are required, compliance will be based on the average of the original sample result and the three confirmation

sample results.

(i) The Department may determine compliance or initiate an enforcement action based on analytical results and other information gathered by Department-authorized representatives and agencies.

11.18(5) MCL Violation and Response for Nitrate and Nitrite

(a) If the average of any sample and its confirmation sample(s) is greater than (>) the MCL for nitrate and/or nitrite, an MCL violation occurs.

(b) In the event of a nitrate and/or nitrite MCL violation, the supplier must:

(i) Notify the Department and initiate consultation no later than 24 hours after the violation occurs.

(ii) Distribute Tier 1 public notice as specified in 11.33.

11.19 INORGANIC CHEMICALS RULE

11.19(1) Applicability and Definitions

(a) For all community and non-transient, non-community water systems, the supplier must comply with the requirements specified in this rule.

(i) For non-transient, non-community water systems, the supplier is required to comply with the sampling requirements for fluoride but is not required to comply with the fluoride MCL unless the Department determines that complying with the MCL is necessary to protect public health.

(ii) For transient, non-community water systems, the supplier may be required to comply with the fluoride MCL if the Department determines that complying with the MCL is necessary to protect public health.

(b) For the purpose of this rule, "INORGANIC CHEMICALS" means all the chemicals listed in Table 11.19-I.

11.19(2) MCL Requirements for Inorganic Chemicals

(a) The inorganic chemical MCLs are as follows:

TABLE 11.19-I INORGANIC CHEMICAL MCLs

Chemical	MCL (mg/L)
Antimony	0.006
Arsenic	0.010
Asbestos	7 Million Fibers/liter (Longer than 10 µm)
Barium	2
Beryllium	0.004
Cadmium	0.005
Chromium	0.1
Cyanide (as free Cyanide)	0.2

Fluoride	4.0 [1]
Mercury	0.002
Nickel	N/A [2]
Selenium	0.05
Thallium	0.002

1 This is the primary MCL for fluoride. Fluoride also has a secondary MCL of 2.0 mg/L.

2 Nickel has no MCL. The supplier must sample for nickel as specified in 11.19(3)(b).

(b) The cited detection limits for inorganic chemical analysis are specified in 40 CFR 141.23(a)(4)(i) as amended July 1, 2013.

(c) The BATs for achieving compliance with the MCLs for inorganic chemicals, with the exception of fluoride, are specified in 40 CFR 141.62(c) as amended July 1, 2013.

(d) For systems supplying less than or equal to (≤) 10,000 people, the SSCTs for achieving compliance with the MCL for arsenic are specified in 40 CFR 141.62(d) as amended July 1, 2013.

11.19(3) Sampling Requirements for Inorganic Chemicals

(a) General Sampling Requirements for Inorganic Chemicals

(i) To determine compliance with the MCLs for inorganic chemicals, the supplier must comply with the sampling requirements specified in this section, 11.19(3).

(ii) The supplier may apply to the Department to sample more frequently than required.

(iii) The Department may:

(A) Require the supplier to sample more frequently than the minimum requirements specified in this section, 11.19(3).

(B) Require the supplier to collect a confirmation sample for any sample result.

(C) Invalidate sample results based on sampling or analytical errors.

(D) Specify when the supplier must sample during each monitoring period.

(iv) If the system draws water from more than one source and the sources are combined before distribution, the supplier must sample during periods of normal operating conditions.

(b) Sampling Requirements for Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Mercury, Nickel, Selenium and Thallium

(i) To determine compliance with the MCLs for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, selenium and thallium, the supplier must comply with the sampling requirements specified in this section, 11.19(3)(b).

(A) For nickel, the supplier must comply with the sampling requirements specified in this section, 11.19(3)(b), and the requirements specified in 11.19(3)(a).

(ii) For new systems, new sources, or reclassified systems that now meet the applicability of this

rule, the Department shall specify the initial sampling frequency at each entry point. The supplier must demonstrate compliance with the MCLs no later than one year after beginning supplying water to the public or one year after being reclassified.

(iii) After completing initial sampling, if the Department requires the supplier to sample at a routine frequency, the supplier must collect one sample at each entry point:

(A) For surface water systems, annually.

(B) For groundwater systems, once during each three-year compliance period.

(iv) The Department may allow the supplier to reduce the sampling frequency based on all of the following information:

(A) All previous sample results.

(B) The degree of variation in previous sample results.

(C) Other factors which may affect chemical concentrations (e.g., changes in groundwater pumping rates, the system's configuration, the system's operating procedures, or stream flows or characteristics).

(v) If any sample result is greater than (>) the MCL, the supplier must collect a confirmation sample at that entry point as soon as possible, but no later than 14 days after the original sample was collected.

(vi) If the average of any sample result and its confirmation sample result is greater than (>) the MCL, the supplier must increase the sampling frequency to quarterly at that entry point.

(A) The Department may allow the supplier to return to a routine sampling frequency at that entry point if the Department determines that the sample results are reliably and consistently below the MCL. To make that determination, the supplier must collect:

(I) For surface water systems, at least four quarters of samples at the entry point where the exceedance occurred.

(II) For groundwater systems, at least two quarters of samples at the entry point where the exceedance occurred.

(c) Sampling Waiver Requirements for Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Mercury, Nickel, Selenium and Thallium

(i) The supplier may apply to the Department or the Department may initiate a sampling waiver from antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium.

(ii) If the Department grants a waiver, the supplier is not required to sample at the frequencies specified in 11.19(3)(b).

(iii) The Department may grant a waiver to the supplier if all previous sample results are reliably and consistently below the MCL. To make that determination, the supplier must have collected:

(A) For surface water systems, annual samples for at least three years.

(B) For groundwater systems, samples for at least three consecutive three-year compliance periods.

(C) For a new source, samples for at least three monitoring periods.

(iv) For a cyanide waiver, the supplier must only demonstrate that the system is not vulnerable to cyanide based on the lack of any industrial source of cyanide.

(v) If the supplier is granted a waiver, the waiver will be effective for no more than one nine-year compliance cycle. The supplier must collect at least one sample while the waiver is effective.

(vi) When the supplier submits new sample results, or when other relevant data are available, the Department may revise the required sampling frequency.

(d) Sampling Requirements for Asbestos

(i) To determine compliance with the MCL for asbestos, the supplier must comply with the sampling requirements specified in this section, 11.19(3)(d).

(ii) For new systems, new sources, or reclassified systems that now meet the applicability of this rule, the supplier must begin sampling at a routine frequency when the new system or source begins supplying water to the public or when the system is reclassified.

(iii) For routine sampling, the supplier must collect one sample during the first three-year compliance period of each nine-year compliance cycle at the following locations:

(A) For systems that are vulnerable to asbestos from corrosion of asbestos-cement pipe, at taps that are supplied by asbestos-cement pipe under conditions where asbestos contamination is most likely to occur.

(B) For systems that are vulnerable to asbestos from source water contamination, at each entry point.

(C) For systems that are vulnerable to asbestos from both corrosion of asbestos-cement pipe and source water contamination, at taps that are supplied by asbestos-cement pipe under conditions where asbestos contamination is most likely to occur.

(iv) If any sample result is greater than (>) the MCL, the supplier must collect a confirmation sample at that sampling location no later than 14 days after the original sample was collected.

(v) If the average of any sample result and its confirmation sample result is greater than (>) the MCL, the supplier must increase the sampling frequency at that sampling location to quarterly.

(A) The Department may allow the supplier to return to routine sampling if the Department determines the sample results at that sampling location are reliably and consistently below the MCL. To make that determination, the supplier must collect:

(I) For surface water systems, at least four quarters of samples at the sampling location where the exceedance occurred.

(II) For groundwater systems, at least two quarters of samples at the sampling location where the exceedance occurred.

(e) Sampling Waiver Requirements for Asbestos

(i) The supplier may apply to the Department for an asbestos waiver or the Department may initiate an asbestos waiver.

(ii) The Department may grant a waiver to the supplier if the system is not vulnerable to potential asbestos contamination based on all of the following information:

(A) Potential asbestos contamination of the source water.

(B) The use of asbestos-cement pipe in the distribution system and the corrosivity of treated water.

(iii) If the Department grants an asbestos waiver, the supplier is not required to sample for asbestos as specified in 11.19(3)(d).

(A) The waiver is effective for one nine-year compliance cycle.

(f) Sampling Requirements for Consecutive Systems with Their Own Sources

(i) For consecutive systems, the Department may modify the inorganic chemical sampling requirements if the system meets all of the following criteria:

(A) The purchased water enters the distribution system separate from any source owned by the consecutive system.

(B) The interconnection of the systems justifies the modification of sampling requirements.

(ii) The supplier must comply with the Department-specified schedule.

11.19(4) Compliance Determination for Inorganic Chemicals

(a) If the supplier samples more frequently than annually, MCL compliance is based on the LRAA.

(i) If a confirmation sample is required, the original sample result will be replaced with the average of the original sample result and the confirmation sample result when calculating the LRAA.

(A) If the supplier fails to collect the confirmation sample, the original sample result will be used when calculating the LRAA.

(ii) If a sample result is less than (<) the cited detection limit, the sample result will be given a value of zero when calculating the LRAA.

(b) If the supplier samples annually or less frequently, MCL compliance is based on each individual sample result, unless a confirmation sample is required.

(i) If a confirmation sample is required, compliance is based on the average of the sample result and its confirmation sample result.

(A) If the supplier fails to collect the confirmation sample, the original sample result will

be used to determine compliance.

(ii) If the average of any sample result and its confirmation sample result is greater than (>) the MCL, the supplier must increase the sampling frequency to quarterly as specified in 11.19(3)(b)(vi). This average will count as the first quarter sample result and compliance with the MCL will be based on the LRAA.

11.19(5) MCL Violations for Inorganic Chemicals

The following constitute inorganic chemical MCL violations:

(a) The LRAA at any entry point is greater than (>) the MCL for any inorganic chemical.

(b) The LRAA, calculated before four consecutive quarters of samples have been collected at any entry point or sampling location, is greater than (>) the MCL for any inorganic chemical regardless of the subsequent sample results.

11.19(6) Response to MCL Violations for Inorganic Chemicals

In the event of an inorganic chemical MCL violation, the supplier must:

(a) Notify the Department no later than 48 hours after the violation occurs.

(b) Distribute Tier 2 public notice as specified in 11.33.

11.19(7) Response to Exceeding the Secondary MCL for Fluoride

(a) For community water systems, if a fluoride sample result is greater than (>) the SMCL of 2.0 mg/L and less than (<) the MCL (4.0 mg/L), the supplier must distribute public notice as specified in this section, 11.19(7).

(b) The supplier must distribute the public notice no later than 12 months after the day the supplier learns of the exceedance.

(i) On a case-by-case basis, the Department may require the supplier to distribute the public notice sooner than 12 months.

(c) The supplier must submit a copy of the notice to the Department and all new billing units and new customers at the time service begins.

(d) If the public notice is posted, the notice must remain in place for as long as the SMCL is exceeded or seven days, whichever is longer.

(e) The supplier must redistribute the notice at least annually for as long as the SMCL is exceeded.

(i) On a case-by-case basis, the Department may require the supplier to redistribute the notice more frequently than annually.

(f) The public notice, including repeat notices, must comply with the requirements for Tier 3 public notice as specified in 11.33.

(g) The supplier must include the following language in the public notice exactly as written and provide the specific information for the text in brackets:

(i) This is an alert about your drinking water and a cosmetic dental problem that might affect

children under nine years of age. At low levels, fluoride can help prevent cavities, but children drinking water containing more than 2 milligrams per liter (mg/L) of fluoride may develop cosmetic discoloration of their permanent teeth (dental fluorosis). The drinking water provided by your community water system [name] has a fluoride concentration of [value] mg/L.

Dental fluorosis, in its moderate or severe forms, may result in a brown staining and/or pitting of the permanent teeth. This problem occurs only in developing teeth, before they erupt from the gums. Children under nine years of age should be provided with alternate sources of drinking water or water that has been treated to remove the fluoride to avoid the possibility of staining and pitting of their permanent teeth. You may also want to contact your dentist about proper use by young children of fluoride-containing products. Older children and adults may safely drink the water.

Drinking water containing more than 4 mg/L of fluoride (the Colorado Department of Public Health and Environment's drinking water standard) can increase your risk of developing bone disease. Your drinking water does not contain more than 4 mg/L of fluoride, but we're required to notify you when we discover that the fluoride levels in your drinking water exceed 2 mg/L because of this cosmetic dental problem.

For more information, please call [name of water system contact] of [name of community water system] at [phone number]. Some home water treatment units are also available to remove fluoride from drinking water. To learn more about available home water treatment units, you may call NSF International at 1-877-8-NSF-HELP.

11.20 SODIUM RULE

11.20(1) Applicability

For all community water systems, the supplier must comply with the requirements specified in this rule.

11.20(2) Requirements for Sodium

(a) For new sources, new systems, or reclassified systems that now meet the applicability of this rule, the supplier must begin collecting routine samples when the new system or source begins serving water to the public or when the system is reclassified.

(b) For routine sampling, the supplier must collect one sample at each entry point:

(i) For surface water systems, annually.

(ii) For groundwater systems, every three years.

(c) If the system has multiple wells drawing raw water from a single aquifer, the Department may reduce the number of sodium samples required if a single entry point is determined to be representative of multiple entry points.

(d) In addition to the general reporting requirements specified in 11.35, the supplier must submit a notice of the sodium sample results to appropriate local public health officials, by direct mail, each year.

(i) The supplier must submit a copy of the notice to the Department no later than ten days after issuing the notice to the appropriate local public health officials.

11.21 ORGANIC CHEMICALS RULE

11.21(1) Applicability and Definitions

(a) For all community and non-transient, non-community water systems, the supplier must comply with the requirements specified in this rule.

(b) "SYNTHETIC ORGANIC CHEMICALS" or "SOCs" mean all of the chemicals specified in Table 11.21-II.

(c) "VOLATILE ORGANIC CHEMICALS" or "VOCs" mean all of the chemicals specified in Table 11.21-I.

11.21(2) MCL Requirements for Organic Chemicals

(a) MCL Requirements for VOCs

(i) The VOC MCLs and cited detection limits are as follows:

TABLE 11.21-I VOC MCLs AND DETECTION LIMITS

CAS No.	Chemical	MCL (mg/L)	Cited detection limit (mg/L)
75-01-4	Vinyl chloride	0.002	0.0005
71-43-2	Benzene	0.005	0.0005
56-23-5	Carbon tetrachloride	0.005	0.0005
107-06-2	1,2-Dichloroethane	0.005	0.0005
79-01-6	Trichloroethylene	0.005	0.0005
106-46-7	Para-Dichlorobenzene	0.075	0.0005
75-35-4	1,1-Dichloroethylene	0.007	0.0005
71-55-6	1,1,1-Trichloroethane	0.2	0.0005
156-59-2	cis-1,2 Dichloroethylene	0.07	0.0005
78-87-5	1,2-Dichloropropane	0.005	0.0005
100-41-4	Ethylbenzene	0.7	0.0005
108-90-7	Monochlorobenzene	0.1	0.0005
95-50-1	o-Dichlorobenzene	0.6	0.0005
100-42-5	Styrene	0.1	0.0005
127-18-4	Tetrachloroethylene	0.005	0.0005
108-88-3	Toluene	1	0.0005
156-60-5	Trans-1,2 Dichloroethylene	0.1	0.0005
1330-20-7	Xylenes (total)	10	0.0005
75-09-2	Dichloromethane (methylene chloride)	0.005	0.0005
120-82-1	1,2,4-Trichlorobenzene	0.07	0.0005
79-00-5	1,1,2-Trichloroethane	0.005	0.0005

(ii) The BATs for achieving compliance with the MCLs for VOCs are specified in 40 CFR 141.61(b) as amended July 1, 2013.

(b) MCL Requirements for SOCs

(i) The SOC MCLs and cited detection limits are as follows:

TABLE 11.21-II SOC MCLs AND DETECTION LIMITS

CAS No.	Chemical	MCL (mg/L)	Cited detection limit (mg/L)
15972-60-8	Alachlor	0.002	0.0002
116-06-3	Aldicarb [1]	0.003	0.0005
1646-87-3	Aldicarb sulfoxide [1]	0.004	0.0005
1646-87-4	Aldicarb sulfone [1]	0.002	0.0008
1912-24-9	Atrazine	0.003	0.0001
1563-66-2	Carbofuran	0.04	0.0009
57-74-9	Chlordane	0.002	0.0002
96-12-8	Dibromochloropropane	0.0002	0.00002
94-75-7	2,4-D	0.07	0.0001
106-93-4	Ethylene dibromide	0.00005	0.00001
76-44-8	Heptachlor	0.0004	0.00004
1024-57-3	Heptachlor epoxide	0.0002	0.00002
58-89-9	Lindane	0.0002	0.00002
72-43-5	Methoxychlor	0.04	0.0001
1336-36-3	Polychlorinated biphenyls	0.0005	0.0001
87-86-5	Pentachlorophenol	0.001	0.00004
8001-35-2	Toxaphene	0.003	0.001
93-72-1	2,4,5-TP (Silvex)	0.05	0.0002
50-32-8	Benzopyrene	0.0002	0.00002
75-99-0	Dalapon	0.2	0.001
103-23-1	Di(2-ethylhexyl)adipate	0.4	0.0006
117-81-7	Di(2-ethylhexyl)phthalate	0.006	0.0006
88-85-7	Dinoseb	0.007	0.0002
85-00-7	Diquat	0.02	0.0004
145-73-3	Endothall	0.1	0.009
72-20-8	Endrin	0.002	0.00001
1071-53-6	Glyphosate	0.7	0.006
118-74-1	Hexachlorobenzene	0.001	0.0001
77-47-4	Hexachlorocyclopentadiene	0.05	0.0001
23135-22-0	Oxamyl (Vydate)	0.2	0.002
1918-02-1	Picloram	0.5	0.0001
122-34-9	Simazine	0.004	0.00007
1746-01-6	2,3,7,8-TCDD (Dioxin)	3×10^{-8}	0.000000005

1 Aldicarb, aldicarb sulfoxide, and aldicarb sulfone are currently under "administrative stay" as a result of litigation. They are therefore treated as unregulated contaminants. The supplier is not required to sample for them or comply with their MCLs.

(ii) The BATs for achieving compliance with the MCLs for SOCs are specified in 40 CFR

141.61(b) as amended July 1, 2013.

11.21(3) Sampling Requirements for Organic Chemicals

(a) General Sampling Requirements for Organic Chemicals

(i) To determine compliance with the MCLs for organic chemicals, the supplier must comply with the sampling specified in this section, 11.21(3).

(ii) The Department may:

(A) Require the supplier to sample more frequently than the minimum requirements specified in this section, 11.21(3).

(B) Require the supplier to collect a confirmation sample for any sample result.

(C) Invalidate sample results based on sampling or analytical errors.

(D) Specify when the supplier must sample during each monitoring period.

(iii) If the system draws water from more than one source and the sources are combined before distribution, the supplier must sample during periods of normal operating conditions.

(b) Sampling Requirements for VOCs

(i) To determine compliance with the MCLs for VOCs, the supplier must comply with the sampling requirements specified in this section, 11.21(3)(b).

(ii) For new systems, new sources, or reclassified systems that now meet the applicability of this rule, the supplier must sample for an initial four consecutive quarters at each entry point and demonstrate compliance with the MCLs no later than one year after beginning supplying water to the public or one year after being reclassified.

(A) For surface water systems, the supplier must sample for vinyl chloride as specified by the Department.

(B) For groundwater systems, the supplier must collect samples for vinyl chloride only as specified in 11.21(3)(b)(vi).

(iii) After completing initial sampling, if all sample results were less than (<) the cited detection limit at an entry point, the supplier must sample at a routine frequency at that entry point. For routine sampling, the supplier must collect one sample annually at that entry point.

(iv) For groundwater systems, if the supplier has collected at least three years of annual samples at an entry point and all sample results were less than or equal to (≤) the cited detection limit, the Department may reduce the required sampling frequency at that entry point to once during each three-year compliance period.

(v) If any sample result is greater than (>) the cited detection limit, but less than or equal to (≤) the MCL, the supplier must increase the sampling frequency to quarterly at each entry point where the detection occurred.

(A) The Department may allow the supplier to return to a routine sampling frequency if the Department determines that the sample results at that entry point are reliably and consistently below the MCL. To make that determination, the supplier must

collect:

(I) For surface water systems, at least four quarters of samples at the entry point where the detection occurred.

(II) For groundwater systems, at least two quarters of samples at the entry point where the detection occurred.

(vi) For groundwater systems, if a sample result is greater than (>) the cited detection limit for one or more of the following chemicals, the supplier must sample quarterly for vinyl chloride at each entry point where the detection occurred:

(A) Trichloroethylene.

(B) Tetrachloroethylene.

(C) 1,2-dichloroethane.

(D) 1,1,1-trichloroethane.

(E) Cis-1,2-dichloroethylene.

(F) Trans-1,2-dichloroethylene.

(G) 1,1-dichloroethylene.

(vii) If the first sample result for vinyl chloride is less than or equal to (≤) the cited detection limit, the Department may reduce the quarterly sampling frequency at that entry point to one sample during each three-year compliance period.

(viii) If any sample result is greater than (>) the MCL, the supplier must increase the sampling frequency to quarterly.

(A) The Department may allow the supplier to return to a routine sampling frequency if all of the following criteria are met:

(I) The supplier has collected four consecutive quarters of samples at that entry point after the exceedance that demonstrate that the system is in compliance.

(II) The Department determines that the sample results at that entry point are reliably and consistently below the MCL.

(ix) When returning to routine sampling, the supplier must collect samples during the quarter that previously resulted in the highest sample result.

(c) Sampling Waiver Requirements for VOCs

(i) The supplier may apply to the Department for a VOC waiver if:

(A) After completing initial sampling, all sample results are less than (<) the cited detection limit for VOCs; or

(B) After three consecutive years of annual sampling following detection of a VOC, all sample results are less than (<) the cited detection limit.

(ii) If the Department grants a VOC waiver, the supplier is not required to sample at the frequencies specified in 11.21(3)(b).

(iii) The Department may grant a VOC waiver to the supplier if the supplier demonstrates that within the watershed or zone of influence no VOCs were used.

(iv) If VOCs have been used or VOC use is unknown, the Department shall consider all of the following factors to determine whether to grant a waiver:

(A) Previous sample results.

(B) How well the source is protected against contamination.

(I) For groundwater sources, the Department shall consider factors including depth of the well, the type of soil, and wellhead protection.

(II) For surface water sources, the Department shall consider watershed protection.

(C) The proximity of the system to a potential point or non-point source of contamination.

(I) Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.

(D) The environmental persistence and transport of VOCs.

(E) The population supplied by the system and the proximity of a smaller system to a larger system.

(v) For groundwater systems, a VOC waiver is effective for six years.

(A) The supplier must update the vulnerability assessment during the effective period of the waiver.

(I) The Department shall reconfirm that the system is non-vulnerable based on the vulnerability assessment.

(a) If the Department does not reconfirm that the system is non-vulnerable no later than three years after the initial determination, the waiver is withdrawn.

(B) The supplier must collect one sample at each entry point while the waiver is effective.

(vi) For surface water systems, the Department shall specify how long a VOC waiver is effective.

(A) The Department shall determine if the system is non-vulnerable based on a vulnerability assessment completed during each compliance period.

(B) The supplier must collect one sample at each entry point at the Department-specified frequency while the waiver is effective.

(vii) For small groundwater systems, the Department may grant a waiver from the initial sampling requirements for 1,2,4-trichlorobenzene specified in 11.21(3)(b)(ii).

(d) Sampling Requirements for SOCs

(i) To determine compliance with the MCLs for SOCs, the supplier must comply with the sampling specified in this section, 11.21(3)(d).

(ii) For new systems, new sources, or reclassified systems that now meet the applicability of this rule, the supplier must collect an initial four consecutive quarters of samples at each entry point and demonstrate compliance with the MCL no later than one year after beginning supplying water to the public or one year after being reclassified.

(iii) After completing initial sampling, if all sample results for an SOC were less than (<) the cited detection limit at an entry point, the supplier must sample at a routine sampling frequency at that entry point. For routine sampling, the supplier must:

(A) For systems supplying greater than (>) 3,300 people, collect one sample in at least two different quarters in one calendar year during each three-year compliance period at that entry point.

(B) For systems supplying less than or equal to (≤) 3,300 people, collect at least one sample during each three-year compliance period at that entry point.

(iv) If any sample result is greater than or equal to (≥) the cited detection limit for an SOC, but less than or equal to the (≤) MCL, the supplier must increase the sampling frequency to quarterly for that SOC at each entry point where the detection occurred.

(A) If a sample result is greater than or equal to (≥) the cited detection limit for one or more of the following the supplier must increase the sampling frequency to quarterly for all of the following at that entry point:

(I) Aldicarb.

(II) Aldicarb sulfone.

(III) Aldicarb sulfoxide.

(B) If a sample result is greater than or equal to (≥) the cited detection limit for one or more of the following the supplier must increase the sampling frequency to quarterly for all of the following at that entry point:

(I) Heptachlor.

(II) Heptachlor epoxide.

(C) The Department may allow the supplier to reduce the sampling frequency to annually if the Department determines that the sample results at that entry point are reliably and consistently below the MCL. To make that determination, the supplier must collect:

(I) For surface water systems, at least four quarters of samples at the entry point where the detection occurred.

(II) For groundwater systems, at least two quarters of samples at the entry point where the detection occurred.

(v) If any sample result is greater than (>) the MCL, the supplier must increase the sampling

frequency to quarterly.

(A) The Department may allow the supplier to reduce the sampling frequency to annually if all of the following criteria are met:

(I) The supplier has collected four consecutive quarters of samples at that entry point after the exceedance that demonstrate that the system is in compliance.

(II) The Department determines that the sample results at that entry point are reliably and consistently below the MCL.

(vi) When reducing to annual sampling, the supplier must sample during the quarter that previously resulted in the highest sample result.

(e) Sampling Waiver Requirements for SOCs

(i) The supplier may apply to the Department for a waiver from any or all of the SOCs.

(A) If an SOC is detected, the supplier must sample annually for three consecutive years and if all sample results are less than (<) the cited detection limit, the supplier may apply to the Department for a waiver.

(ii) If the Department grants the waiver, the supplier is not required to sample at the frequencies specified in 11.21(3)(d) for that SOC.

(iii) The Department may grant an SOC waiver to the supplier if the supplier demonstrates that within the watershed or zone of influence, that SOC was not used (including transport, storage, or disposal).

(iv) If an SOC has been used or the use is unknown, the Department shall consider all of the following factors in determining whether to grant a waiver:

(A) Previous sample results.

(B) How well the source is protected against contamination, factors may include the depth of the well, the type of soil, and the integrity of the well casing.

(C) The proximity of the system to a potential point or non-point source of contamination.

(I) Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.

(II) Non-point sources include the use of pesticides to control insect and weed pests on agricultural areas, forest lands, home and gardens, and other land application uses.

(D) The environmental persistence and transport of pesticides or PCBs.

(E) Elevated nitrate levels at the source(s).

(F) Use of PCBs in equipment used in the production, storage, or distribution of water.

(v) The supplier must reapply for an SOC waiver each three-year compliance period.

11.21(4) Compliance Determination for Organic Chemicals

(a) If the supplier samples more frequently than annually, MCL compliance is based on the LRAA.

(i) If a confirmation sample is required, the original sample result will be replaced with the average of the original sample result and the confirmation sample result when calculating the LRAA.

(A) If the supplier fails to collect the confirmation sample, the original sample result will be used when calculating the LRAA.

(ii) If a sample result is less than (<) the cited detection limit, the sample result will be given a value of zero when calculating the LRAA.

(b) If the supplier samples annually or less frequently, MCL compliance is based on each individual sample result, unless a confirmation sample is required.

(i) If a confirmation sample is required, compliance will be based on by the average of the sample result and its confirmation sample result.

(A) If the supplier fails to collect the confirmation sample, the original sample result will be used to determine compliance.

(ii) If the sample result or average of any sample result and its confirmation sample result, if a confirmation sample is required, is greater than (>) the MCL, the supplier must increase the sampling frequency to quarterly as specified in 11.21(3)(b)(viii) and/or 11.21(3)(d)(v). This average, or sample result, will count as the first quarter result and compliance with the MCL will be based on an LRAA.

(c) The Department may determine compliance or initiate enforcement action based on sample results and other information gathered by Department-authorized representatives and agencies.

11.21(5) Acrylamide and Epichlorohydrin Certification

If acrylamide and epichlorohydrin are used in the drinking water system, the supplier must annually certify, in writing, to the Department, using a Department-approved third party or manufacturer's certification, that the combination of dose and monomer level is less than or equal to (≤) the following levels:

(a) Acrylamide = 0.05% dosed at 1 ppm (or equivalent).

(b) Epichlorohydrin = 0.01% dosed at 20 ppm (or equivalent).

11.21(6) Violations for Organic Chemicals

(a) The following constitute organic chemical MCL violations:

(i) The LRAA at any entry point is greater than (>) the MCL for any organic chemical.

(ii) The LRAA, calculated before four consecutive quarters of samples have been collected at any entry point, is greater than (>) the MCL for any organic chemical regardless of the subsequent sample results.

(b) Failure to comply with the acrylamide and epichlorohydrin certification requirements as specified in 11.21(5) constitutes a treatment technique violation.

11.21(7) Response to Violations for Organic Chemicals

In the event of an organic chemical MCL violation or an acrylamide and epichlorohydrin treatment technique violation, the supplier must:

(a) Notify the Department no later than 48 hours after the violation occurs.

(b) Distribute Tier 2 public notice as specified in 11.33.

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