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**Title 40 —Protection of Environment**  
**Chapter I —Environmental Protection Agency**  
**Subchapter D —Water Programs**

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## PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

**Authority:** 42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, 300j-9, and 300j-11.

**Source:** 40 FR 59570, Dec. 24, 1975, unless otherwise noted.

**Editorial Note:** Nomenclature changes to part 141 appear at 69 FR 18803, Apr. 9, 2004.

Note: For community water systems serving 75,000 or more persons, monitoring must begin 1 year following promulgation and the effective date of the MCL is 2 years following promulgation. For community water systems serving 10,000 to 75,000 persons, monitoring must begin within 3 years from the date of promulgation and the effective date of the MCL is 4 years from the date of promulgation. Effective immediately, systems that plan to make significant modifications to their treatment processes for the purpose of complying with the TTHM MCL are required to seek and obtain State approval of their treatment modification plans. This note affects §§ 141.2, 141.6, 141.12, 141.24 and 141.30. For additional information see 44 FR 68641, Nov. 29, 1979.

## Subpart A—General

### § 141.1 Applicability.

This part establishes primary drinking water regulations pursuant to section 1412 of the Public Health Service Act, as amended by the Safe Drinking Water Act (Pub. L. 93-523); and related regulations applicable to public water systems.

### § 141.2 Definitions.

As used in this part, the term:

**Act** means the Public Health Service Act, as amended by the Safe Drinking Water Act, Public Law 93-523.

**Action level**, for the purpose of subpart I of this part only, means the concentrations of lead or copper in water as specified in § 141.80(c) which determines requirements under subpart I of this part. The lead action level is 0.010 mg/L and the copper action level is 1.3 mg/L.

**Aerator** means the device embedded in the water faucet to enhance air flow with the water stream and to prevent splashing.

**Bag filters** are pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed 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 outside.

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

**Best available technology or BAT** means the best technology, treatment techniques, or other means which the Administrator finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking cost into consideration). For the purposes of setting MCLs for synthetic organic chemicals, any BAT must be at least as effective as granular activated carbon.

**Cartridge filters** are pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed 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.

**Child care facility**, for the purpose of subpart I of this part only, means a location that houses a provider of child care, day care, or early learning services to children, as licensed by the State, local, or Tribal licensing agency.

**Clean compliance history** is, for the purposes of subpart Y, a record of no MCL violations under § 141.63; no monitoring violations under § 141.21 or subpart Y; and no coliform treatment technique trigger exceedances or treatment technique violations under subpart Y.

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

**Combined distribution system** is the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

**Community water system** means a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

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

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

**Comprehensive performance evaluation (CPE)** is a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. For purpose of compliance with subparts P and T of this part, the comprehensive performance evaluation must consist of at least the following components: Assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

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

**Connector**, also referred to as a gooseneck or pigtail, means a short segment of piping not exceeding three feet that can be bent and is used for connections between service piping, typically connecting the *service line* to the main. For purposes of subpart I of this part, lead connectors are not considered to be part of the service line.

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

**Contaminant** means any physical, chemical, biological, or radiological substance or matter in water.

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

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

**CT** or **CT<sub>calc</sub>** is the product of "residual disinfectant concentration" (C) in mg/1 determined before or at the first customer, and the corresponding "disinfectant contact time" (T) in minutes, *i.e.*, "C" × "T". If a public water system applies disinfectants at more than one point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or "total inactivation ratio." In determining the total inactivation ratio, the public water system must determine the residual disinfectant concentration of each disinfection sequence and corresponding contact time before any subsequent disinfection application point(s). "CT<sub>99.9</sub>" is the CT value required for 99.9 percent (3-log) inactivation of *Giardia lamblia* cysts. CT<sub>99.9</sub> for a variety of disinfectants and conditions appear in tables 1.1-1.6, 2.1, and 3.1 of § 141.74(b)(3).

$$\frac{CT_{calc}}{CT_{99.9}}$$

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

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

is calculated by adding together the inactivation ratio for each disinfection sequence. A total inactivation ratio equal to or greater than 1.0 is assumed to provide a 3-log inactivation of *Giardia lamblia* cysts.

**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.

**Direct filtration** means a series of processes including coagulation and filtration but excluding sedimentation resulting in substantial particulate removal.

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

**Disinfectant contact time** ("T" in CT calculations) means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration ("C") is measured. Where only one "C" is measured, "T" is the time in minutes that it takes for water to move from the point of disinfectant application to a point before or at where residual disinfectant concentration ("C") is measured. Where more than one "C" is measured, "T" is

- (a) for the first measurement of "C", the time in minutes that it takes for water to move from the first or only point of disinfectant application to a point before or at the point where the first "C" is measured and

- (b) for subsequent measurements of “C”, the time in minutes that it takes for water to move from the previous “C” measurement point to the “C” measurement point for which the particular “T” is being calculated. Disinfectant contact time in pipelines must be calculated based on “plug flow” by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe. Disinfectant contact time within mixing basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.

**Disinfection** means a process which inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.

**Disinfection profile** is a summary of *Giardia lamblia* inactivation through the treatment plant. The procedure for developing a disinfection profile is contained in § 141.172 (Disinfection profiling and benchmarking) in subpart P and §§ 141.530-141.536 (Disinfection profile) in subpart T of this part.

**Distribution System and Site Assessment** means the requirements under subpart I of this part, pursuant to § 141.82(j), that water systems must perform at every tap sampling site that yields a lead result above the lead action level of 0.010 mg/L.

**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.

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

**Dual sample set** is a set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an IDSE under subpart U of this part and determining compliance with the TTHM and HAA5 MCLs under subpart V of this part.

**Effective corrosion inhibitor residual**, for the purpose of subpart I of this part only, means a concentration sufficient to form a passivating film on the interior walls of a pipe.

**Elementary school**, for the purpose of subpart I of this part only, means a *school* classified as elementary by State and local practice and composed of any span of grades (including pre-school) not above grade 8.

**Enhanced coagulation** means the addition of sufficient coagulant for improved removal of disinfection byproduct precursors by conventional filtration treatment.

**Enhanced softening** means the improved removal of disinfection byproduct precursors by precipitative softening.

**Fifth liter sample**, for purposes of subpart I of this part, means a one-liter sample of tap water collected in accordance with § 141.86(b).

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

**Filtration** means a process for removing particulate matter from water by passage through porous media.

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

**First-liter sample**, for the purpose of subpart I of this part only, means a sample collected of the first one-liter volume of tap water drawn in accordance with § 141.86(b).

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

**Flowing stream** is a course of running water flowing in a definite channel.

**GAC10** means granular activated carbon filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days, except that the reactivation frequency for GAC10 used as a best available technology for compliance with subpart V MCLs under § 141.64(b)(2) shall be 120 days.

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

**Galvanized requiring replacement service line**, for the purpose of subpart I of this part only, means a *galvanized service line* that currently is or ever was downstream of a *lead service line*; or is currently downstream of a *lead status unknown service line*. For this definition, downstream means in the direction of flow through the service line. If the water system is unable to demonstrate that the *galvanized service line* was never downstream of a *lead service line*, it is a *galvanized requiring replacement service line* for purposes of the service line inventory and replacement requirements pursuant to § 141.84.

**Galvanized service line**, for the purpose of subpart I of this part only, means a *service line* that is made of iron or steel that has been dipped in zinc to prevent corrosion and rusting.

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

**Gross alpha particle activity** means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

**Gross beta particle activity** means the total radioactivity due to beta particle emission as inferred from measurements on a dry sample.

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

**Halogen** means one of the chemical elements chlorine, bromine or iodine.

**Hazard Index (HI)** is the sum of component hazard quotients (HQs), which are calculated by dividing the measured regulated PFAS component contaminant concentration in water (e.g., expressed as parts per trillion (ppt) or nanograms per liter (ng/l)) by the associated health-based water concentration (HBWC) expressed in the same units as the measured concentration (e.g., ppt or ng/l). For PFAS, a mixture Hazard Index greater than 1 (unitless) is an exceedance of the MCL.

**Hazard quotient (HQ)** means the ratio of the measured concentration in drinking water to the health-based water concentration (HBWC).

**Health-based water concentration (HBWC)** means level below which there are no known or anticipated adverse health effects over a lifetime of exposure, including sensitive populations and life stages, and allows for an adequate margin of safety.

**HFPO-DA or GenX chemicals** means Chemical Abstract Service registration number 122499-17-6, chemical formula C<sub>6</sub>F<sub>11</sub>O<sub>3</sub>-, International Union of Pure and Applied Chemistry preferred name 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propanoate, along with its conjugate acid and any salts, derivatives, isomers, or combinations thereof.

**Initial compliance period** means the first full three-year compliance period which begins at least 18 months after promulgation, except for contaminants listed at § 141.61(a) (19)-(21), (c) (19)-(33), and § 141.62(b) (11)-(15), initial compliance period means the first full three-year compliance period after promulgation for systems with 150 or more service connections (January 1993-December 1995), and first full three-year compliance period after the effective date of the regulation (January 1996-December 1998) for systems having fewer than 150 service connections.

**Lake/reservoir** refers to a natural or man made basin or hollow on the Earth's surface in which water collects or is stored that may or may not have a current or single direction of flow.

**Large water system**, for the purpose of subpart I of this part only, means a water system that serves more than 50,000 persons.

**Lead service line**, for the purpose of subpart I of this part only, means a *service line* that is made of lead or where a portion of the *service line* is made of lead. A lead-lined galvanized service line is defined as a *lead service line*.

**Lead status unknown service line**, for the purpose of subpart I of this part only, means a *service line* whose pipe material has not been demonstrated to be a *lead service line*, *galvanized requiring replacement service line*, or a non-lead service line pursuant to § 141.84(a)(3).

**Legionella** means a genus of bacteria, some species of which have caused a type of pneumonia called Legionnaires Disease.

**Level 1 assessment** is an evaluation to identify the possible presence of sanitary defects, defects in distribution system coliform monitoring practices, and (when possible) the likely reason that the system triggered the assessment. It is conducted by the system operator or owner. Minimum elements include review and identification of atypical events that could affect distributed water quality or indicate that distributed water quality was impaired; changes in distribution system maintenance and operation that could affect distributed water quality (including water storage); source and treatment considerations that bear on distributed water quality, where appropriate (e.g., whether a ground water system is disinfected); existing water quality monitoring data; and inadequacies in sample sites, sampling protocol, and sample

processing. The system must conduct the assessment consistent with any State directives that tailor specific assessment elements with respect to the size and type of the system and the size, type, and characteristics of the distribution system.

**Level 2 assessment** is an evaluation to identify the possible presence of sanitary defects, defects in distribution system coliform monitoring practices, and (when possible) the likely reason that the system triggered the assessment. A Level 2 assessment provides a more detailed examination of the system (including the system's monitoring and operational practices) than does a Level 1 assessment through the use of more comprehensive investigation and review of available information, additional internal and external resources, and other relevant practices. It is conducted by an individual approved by the State, which may include the system operator. Minimum elements include review and identification of atypical events that could affect distributed water quality or indicate that distributed water quality was impaired; changes in distribution system maintenance and operation that could affect distributed water quality (including water storage); source and treatment considerations that bear on distributed water quality, where appropriate (e.g., whether a ground water system is disinfected); existing water quality monitoring data; and inadequacies in sample sites, sampling protocol, and sample processing. The system must conduct the assessment consistent with any State directives that tailor specific assessment elements with respect to the size and type of the system and the size, type, and characteristics of the distribution system. The system must comply with any expedited actions or additional actions required by the State in the case of an *E. coli* MCL violation.

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

**Man-made beta particle and photon emitters** means all radionuclides emitting beta particles and/or photons listed in Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure, NBS Handbook 69, except the daughter products of thorium-232, uranium-235 and uranium-238.

**Maximum contaminant level** means the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

**Maximum contaminant level goal or MCLG** means the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. Maximum contaminant level goals are nonenforceable health goals.

**Maximum residual disinfectant level (MRDL)** means a level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. For chlorine and chloramines, a PWS is in compliance with the MRDL when the running annual average of monthly averages of samples taken in the distribution system, computed quarterly, is less than or equal to the MRDL. For chlorine dioxide, a PWS is in compliance with the MRDL when daily samples are taken at the entrance to the distribution system and no two consecutive daily samples exceed the MRDL. MRDLs are enforceable in the same manner as maximum contaminant levels under Section 1412 of the Safe Drinking Water Act. There is convincing evidence that addition of a disinfectant is necessary for control of waterborne microbial contaminants. Notwithstanding the MRDLs listed in § 141.65, operators may increase residual disinfectant levels of chlorine or chloramines (but not chlorine dioxide) in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as distribution line breaks, storm runoff events, source water contamination, or cross-connections.



*Maximum residual disinfectant level goal (MRDLG)* means the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MRDLGs are nonenforceable health goals and do not reflect the benefit of the addition of the chemical for control of waterborne microbial contaminants.

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

*Medium water system*, for the purpose of subpart I of this part only, means a water system that serves greater than 10,000 persons and less than or equal to 50,000 persons.

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

*Method detection limit (MDL)* means the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.

*Near the first service connection* means at one of the 20 percent of all service connections in the entire system that are nearest the water supply treatment facility, as measured by water transport time within the distribution system.

*Newly regulated public water system*, for the purpose of subpart I only, refers to either:

- (1) An existing *public water system* that was not subject to National Primary Drinking Water Regulations in this part on October 16, 2024, because the system met the requirements of section 1411 of the Safe Drinking Water Act and § 141.3; or
- (2) An existing water system that did not meet the definition of a *public water system* in § 141.2 on October 16, 2024. This term does not include existing water systems under new or restructured ownership or management.

*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 (TWS)” or a “non-transient non-community water system (NTNCWS).”

*Non-transient non-community water system* or *NTNCWS* means a public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year.

*Optimal corrosion control treatment (OCCT)*, for the purpose of subpart I of this part only, means the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while ensuring that the treatment does not cause the water system to violate any National Primary Drinking Water Regulations in this part.

*Partial service line replacement*, for the purpose of subpart I of this part only, means replacement of any portion of a *lead service line* or *galvanized requiring replacement service line*, as defined in this section, that leaves in service any length of lead or galvanized requiring replacement service line upon completion of the work.

**Performance evaluation sample** means a reference sample provided to a laboratory for the purpose of demonstrating that the laboratory can successfully analyze the sample within limits of performance specified by the Agency. The true value of the concentration of the reference material is unknown to the laboratory at the time of the analysis.

**Person** means an individual; corporation; company; association; partnership; municipality; or State, Federal, or tribal agency.

**PFBS** means Chemical Abstract Service registration number 45187-15-3, chemical formula C<sub>4</sub>F<sub>9</sub>SO<sub>3</sub>-, perfluorobutane sulfonate, along with its conjugate acid and any salts, derivatives, isomers, or combinations thereof.

**PFHxS** means Chemical Abstract Service registration number 108427-53-8, chemical formula C<sub>6</sub>F<sub>13</sub>SO<sub>3</sub>-, perfluorohexane sulfonate, along with its conjugate acid and any salts, derivatives, isomers, or combinations thereof.

**PFNA** means Chemical Abstract Service registration number 72007-68-2, chemical formula C<sub>9</sub>F<sub>17</sub>O<sub>2</sub>-, perfluorononanoate, along with its conjugate acid and any salts, derivatives, isomers, or combinations thereof.

**PFOA** means Chemical Abstract Service registration number 45285-51-6, chemical formula C<sub>8</sub>F<sub>15</sub>O<sub>2</sub>-, perfluorooctanoate, along with its conjugate acid and any salts, derivatives, isomers, or combinations thereof.

**PFOS** means Chemical Abstract Service registration number 45298-90-6, chemical formula C<sub>8</sub>F<sub>17</sub>SO<sub>3</sub>-, perfluorooctanesulfonate, along with its conjugate acid and any salts, derivatives, isomers, or combinations thereof.

**Picocurie (pCi)** means the quantity of radioactive material producing 2.22 nuclear transformations per minute.

**Pitcher filter** means a non-plumbed water filtration device, which consists of a gravity fed water filtration cartridge and a filtered drinking water reservoir, that is certified by an American National Standards Institute accredited certifier to reduce lead in drinking water.

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

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

**Point-of-entry treatment device (POE)** is 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.

**Point-of-use treatment device or point of use device (POU)** is a water treatment device physically installed or connected to a single fixture, outlet, or tap to reduce or remove contaminants in drinking water. For the purposes of subpart I of this part, it must be certified by an American National Standards Institute accredited certifier to reduce lead in drinking water.

**Practical quantitation limit (PQL)** means the minimum concentration of an analyte (substance) that can be measured with a high degree of confidence that the analyte is present at or above that concentration.

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

**Pre-stagnation flushing** is the opening of tap(s) to flush standing water from plumbing prior to the minimum 6-hour stagnation period in anticipation of lead and copper tap sampling under subpart I of this part.

**Public water system** means a system for the provision to the public of water for human consumption through pipes or, after August 5, 1998, other constructed conveyances, if such system has at least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year. Such term includes: any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system; and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. Such term does not include any "special irrigation district." A public water system is either a "community water system" or a "noncommunity water system."

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

**Repeat compliance period** means any subsequent compliance period after the initial compliance period.

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

**Sanitary defect** is a defect that could provide a pathway of entry for microbial contamination into the distribution system or that is indicative of a failure or imminent failure in a barrier that is already in place.

**Sanitary survey** means an onsite review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

**School**, for the purpose of subpart I of this part only, means any building(s) associated with public, private, or charter institutions that primarily provides teaching and learning for elementary or secondary students.

**Seasonal system** is a non-community water system that is not operated as a public water system on a year-round basis and starts up and shuts down at the beginning and end of each operating season.

**Secondary school**, for the purpose of subpart I of this part only, means a school comprising any span of grades beginning with the next grade following an elementary school (usually 7, 8, or 9) and ending with grade 12. Secondary schools include both junior high schools and senior high schools and typically span grades 7 through 12.

**Sedimentation** means a process for removal of solids before filtration by gravity or separation.

**Service connection**, as used in the definition of *public water system*, does not include a connection to a system that delivers water by a constructed conveyance other than a pipe if:

- (1) The water is used exclusively for purposes other than residential uses (consisting of drinking, bathing, and cooking, or other similar uses);
- (2) The State determines that alternative water to achieve the equivalent level of public health protection provided by the applicable national primary drinking water regulation is provided for residential or similar uses for drinking and cooking; or

- (3) The State 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 national primary drinking water regulations.

**Service line**, for the purpose of subpart I of this part only, means a portion of pipe that connects the water main (or other conduit for distributing water to individual consumers or groups of consumers) to the building inlet. Where a building is not present, the service line connects the water main (or other conduit for distributing water to individual consumers or groups of consumers) to the outlet.

**Single family structure**, for the purpose of subpart I of this part only, means a building constructed as a single-family residence that is currently used as either a residence or a place of business.

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

**Small water system**, for the purpose of subpart I of this part only, means a water system that serves 10,000 persons or fewer.

**Special irrigation district** means an irrigation district in existence prior to 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 in section 1401(4)(B)(i)(II) or (III).

**Standard sample** means the aliquot of finished drinking water that is examined for the presence of coliform bacteria.

**State** means the agency of the State or Tribal government which has jurisdiction over public water systems. During any period when a State or Tribal government does not have primary enforcement responsibility pursuant to section 1413 of the Act, the term "State" means the Regional Administrator, U.S. Environmental Protection Agency.

**Subpart H systems** means public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to the requirements of subpart H of this part.

**Supplier of water** means any person who owns or operates a public water system.

**Surface water** means all water which is open to the atmosphere and subject to surface runoff.

**SUVA** means Specific Ultraviolet Absorption at 254 nanometers (nm), an indicator of the humic content of water. It is a calculated parameter obtained by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV<sub>254</sub>) (in m<sup>-1</sup>) by its concentration of dissolved organic carbon (DOC) (in mg/L).

**System with a single service connection** means a system which supplies drinking water to consumers via a single service line.

**System without corrosion control treatment**, for the purpose of subpart I of this part, means a water system that does not have or purchases all of its water from a system that does not have:

- (1) An optimal corrosion control treatment approved by the State; or
- (2) Any pH adjustment, alkalinity adjustment, and/or corrosion inhibitor addition resulting from other water quality adjustments as part of its treatment train infrastructure.

*Tap monitoring period*, for the purpose of subpart I of this part only, means the period of time during which each water system must conduct tap sampling for lead and copper analysis. The applicable tap monitoring period is determined by lead and copper concentrations in tap samples. The length of the tap monitoring period can range from six months to nine years.

*Tap sampling period*, for the purpose of subpart I of this part only, means the time period, within a tap monitoring period, during which the water system is required to collect samples for lead and copper analysis.

*Tap sampling protocol* means the method for collecting tap samples pursuant to § 141.86(b).

*Too numerous to count* means that the total number of bacterial colonies exceeds 200 on a 47-mm diameter membrane filter used for coliform detection.

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

*Total trihalomethanes (TTHM)* means the sum of the concentration in milligrams per liter of the trihalomethane compounds (trichloromethane [chloroform], dibromochloromethane, bromodichloromethane and tribromomethane [bromoform]), rounded to two significant figures.

*Transient non-community water system or TWS* means a non-community water system that does not regularly serve at least 25 of the same persons over six months per year.

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

*Two-stage lime softening* is a process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes in series prior to filtration.

*Uncovered finished water storage facility* is a tank, reservoir, or other facility used to store water that will undergo no further treatment to reduce microbial pathogens except residual disinfection and is directly open to the atmosphere.

*Virus* means a virus of fecal origin which is infectious to humans by waterborne transmission.

*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.

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

*Wide-mouth bottles*, for the purpose of subpart I of this part only, means bottles one liter in volume that have a mouth with an inner diameter that measures at least 40 millimeters wide.

[40 FR 59570, Dec. 24, 1975]

**Editorial Note:** For FEDERAL REGISTER citations affecting § 141.2, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.govinfo.gov](http://www.govinfo.gov).

### § 141.3 Coverage.

This part shall apply to each public water system, unless the public water system meets all of the following conditions:

- (a) Consists only of distribution and storage facilities (and does not have any collection and treatment facilities);
- (b) Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply;
- (c) Does not sell water to any person; and
- (d) Is not a carrier which conveys passengers in interstate commerce.

### § 141.4 Variances and exemptions.

- (a) Variances or exemptions from certain provisions of these regulations may be granted pursuant to sections 1415 and 1416 of the Act and subpart K of part 142 of this chapter (for small system variances) by the entity with primary enforcement responsibility, except that variances or exemptions from the MCLs for total coliforms and *E. coli* and variances from any of the treatment technique requirements of subpart H of this part may not be granted.
- (b) EPA has stayed the effective date of this section relating to the total coliform MCL of § 141.63(a) for systems that demonstrate to the State that the violation of the total coliform MCL is due to a persistent growth of total coliforms in the distribution system rather than fecal or pathogenic contamination, a treatment lapse or deficiency, or a problem in the operation or maintenance of the distribution system. This is stayed until March 31, 2016, at which time the total coliform MCL is no longer effective.

Note to paragraph (a): As provided in § 142.304(a), small system variances are not available for rules addressing microbial contaminants, which would include subparts H, P, S, T, W, and Y of this part.

[78 FR 10346, Feb. 13, 2013]

### § 141.5 Siting requirements.

Before a person may enter into a financial commitment for or initiate construction of a new public water system or increase the capacity of an existing public water system, he shall notify the State and, to the extent practicable, avoid locating part or all of the new or expanded facility 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 thereof; or
- (b) Except for intake structures, is within the floodplain of a 100-year flood or is lower than any recorded high tide where appropriate records exist. The U.S. Environmental Protection Agency will not seek to override land use decisions affecting public water systems siting which are made at the State or local government levels.

## § 141.6 Effective dates.

- (a) Except as provided in paragraphs (b) through (l) of this section the regulations set forth in this part take effect on June 24, 1977.
- (b) The regulations for total trihalomethanes set forth in § 141.12(c) shall take effect 2 years after the date of promulgation of these regulations for community water systems serving 75,000 or more individuals, and 4 years after the date of promulgation for communities serving 10,000 to 74,999 individuals.
- (c) The regulations set forth in §§ 141.11(d); 141.21(a), (c) and (i); 141.22(a) and (e); 141.23(a)(3) and (a)(4); 141.23(f); 141.24(e) and (f); 141.25(e); 141.27(a); 141.28(a) and (b); 141.31(a), (d) and (e); 141.32(b)(3); and 141.32(d) shall take effect immediately upon promulgation.
- (d) The regulations set forth in § 141.41 shall take effect 18 months from the date of promulgation. Suppliers must complete the first round of sampling and reporting within 12 months following the effective date.
- (e) The regulations set forth in § 141.42 shall take effect 18 months from the date of promulgation. All requirements in § 141.42 must be completed within 12 months following the effective date.
- (f) The regulations set forth in § 141.11(c) and § 141.23(g) are effective May 2, 1986. Section 141.23(g)(4) is effective October 2, 1987.
- (g) The regulations contained in § 141.6, paragraph (c) of the table in 141.12, and 141.62(b)(1) are effective July 1, 1991. The regulations contained in §§ 141.11(b), 141.23, 141.24, 142.57(b), 143.4(b)(12) and (b)(13), are effective July 30, 1992. The regulations contained in the revisions to §§ 141.32(e) (16), (25) through (27) and (46); 141.61(c)(16); and 141.62(b)(3) are effective January 1, 1993. The effective date of regulations contained in § 141.61(c) (2), (3), and (4) is postponed.
- (h) Regulations for the analytic methods listed at § 141.23(k)(4) for measuring antimony, beryllium, cyanide, nickel, and thallium are effective August 17, 1992. Regulations for the analytic methods listed at § 141.24(f)(16) for dichloromethane, 1,2,4-trichlorobenzene, and 1,1,2-trichloroethane are effective August 17, 1992. Regulations for the analytic methods listed at § 141.24(h)(12) for measuring dalapon, dinoseb, diquat, endothall, endrin, glyphosate, oxamyl, picloram, simazine, benzo(a)pyrene, di(2-ethylhexyl)adipate, di(2-ethylhexyl)phthalate, hexachlorobenzene, hexachlorocyclopentadiene, and 2,3,7,8-TCDD are effective August 17, 1992. The revision to § 141.12(a) promulgated on July 17, 1992 is effective on August 17, 1992.
- (i) [Reserved]
- (j) The arsenic maximum contaminant levels (MCL) listed in § 141.62 is effective for the purpose of compliance on January 23, 2006. Requirements relating to arsenic set forth in §§ 141.23(i)(4), 141.23(k)(3) introductory text, 141.23(k)(3)(ii), 141.51(b), 141.62(b), 141.62(b)(16), 141.62(c), 141.62(d), and 142.62(b) revisions in Appendix A of subpart O for the consumer confidence rule, and Appendices A and B of subpart Q for the public notification rule are effective for the purpose of compliance on January 23, 2006. However, the consumer confidence rule reporting requirements relating to arsenic listed in § 141.154(b) and (f) are effective for the purpose of compliance on February 22, 2002.
- (k) Regulations set forth in §§ 141.23(i)(1), 141.23(i)(2), 141.24(f)(15), 141.24(f)(22), 141.24(h)(11), 141.24(h)(20), 142.16(e), 142.16(j), and 142.16(k) are effective for the purpose of compliance on January 22, 2004.

- (l) The regulations pertaining to the per- and polyfluoroalkyl substances (PFAS) chemicals set forth in subpart Z of this part are effective June 25, 2024. See § 141.900 for the compliance dates for provisions under subpart Z. Compliance with reporting requirements under subpart Z, in accordance with subparts O (the consumer confidence rule) and Q (the public notification rule) of this part are required on April 26, 2027, except for notification requirements in § 141.203 related to violations of the MCLs. The compliance date for the PFAS MCLs in § 141.61, as specified in § 141.60, and for § 141.203 notifications of violations of the PFAS MCLs is April 26, 2029.

[44 FR 68641, Nov. 29, 1979, as amended at 45 FR 57342, Aug. 27, 1980; 47 FR 10998, Mar. 12, 1982; 51 FR 11410, Apr. 2, 1986; 56 FR 30274, July 1, 1991; 57 FR 22178, May 27, 1992; 57 FR 31838, July 17, 1992; 59 FR 34322, July 1, 1994; 61 FR 24368, May 14, 1996; 66 FR 7061, Jan. 22, 2001; 66 FR 28350, May 22, 2001; 89 FR 32744, Apr. 26, 2024]

## Subpart B—Maximum Contaminant Levels

### § 141.11 Maximum contaminant levels for inorganic chemicals.

- (a) The maximum contaminant level for arsenic applies only to community water systems. The analyses and determination of compliance with the 0.05 milligrams per liter maximum contaminant level for arsenic use the requirements of § 141.23.
- (b) The maximum contaminant level for arsenic is 0.05 milligrams per liter for community water systems until January 23, 2006.
- (c) [Reserved]
- (d) At the discretion of the State, nitrate levels not to exceed 20 mg/l may be allowed in a non-community water system if the supplier of water demonstrates to the satisfaction of the State that:
- (1) Such water will not be available to children under 6 months of age; and
  - (2) The non-community water system is meeting the public notification requirements under § 141.209, including continuous posting of the fact that nitrate levels exceed 10 mg/l and the potential health effects of exposure; and
  - (3) Local and State public health authorities will be notified annually of nitrate levels that exceed 10 mg/l; and
  - (4) No adverse health effects shall result.

[40 FR 59570, Dec. 24, 1975, as amended at 45 FR 57342, Aug. 27, 1980; 47 FR 10998, Mar. 12, 1982; 51 FR 11410, Apr. 2, 1986; 56 FR 3578, Jan. 30, 1991; 56 FR 26548, June 7, 1991; 56 FR 30274, July 1, 1991; 56 FR 32113, July 15, 1991; 60 FR 33932, June 29, 1995; 65 FR 26022, May 4, 2000; 66 FR 7061, Jan. 22, 2001]

### § 141.12 [Reserved]

### § 141.13 Maximum contaminant levels for turbidity.

The maximum contaminant levels for turbidity are applicable to both community water systems and non-community water systems using surface water sources in whole or in part. The maximum contaminant levels for turbidity in drinking water, measured at a representative entry point(s) to the distribution system, are:



- (a) One turbidity unit (TU), as determined by a monthly average pursuant to § 141.22, except that five or fewer turbidity units may be allowed if the supplier of water can demonstrate to the State that the higher turbidity does not do any of the following:
  - (1) Interfere with disinfection;
  - (2) Prevent maintenance of an effective disinfectant agent throughout the distribution system; or
  - (3) Interfere with microbiological determinations.
- (b) Five turbidity units based on an average for two consecutive days pursuant to § 141.22.

[40 FR 59570, Dec. 24, 1975]

## Subpart C—Monitoring and Analytical Requirements

### § 141.21 Coliform sampling.

- (a) *Routine monitoring.*
  - (1) Public water systems must collect total coliform samples at sites which are representative of water throughout the distribution system according to a written sample siting plan. These plans are subject to State review and revision.
  - (2) The monitoring frequency for total coliforms for community water systems is based on the population served by the system, as follows:

#### TOTAL COLIFORM MONITORING FREQUENCY FOR COMMUNITY WATER SYSTEMS

Population served	Minimum number of samples per month
25 to 1,000 <sup>1</sup>	1
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30

<sup>1</sup> Includes public water systems which have at least 15 service connections, but serve fewer than 25 persons.

Population served	Minimum number of samples per month
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 970,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480

<sup>1</sup> Includes public water systems which have at least 15 service connections, but serve fewer than 25 persons.

If a community water system serving 25 to 1,000 persons has no history of total coliform contamination in its current configuration and a sanitary survey conducted in the past five years shows that the system is supplied solely by a protected groundwater source and is free of sanitary defects, the State may reduce the monitoring frequency specified above, except that in no case may the State reduce the monitoring frequency to less than one sample per quarter. The State must approve the reduced monitoring frequency in writing.

(3) The monitoring frequency for total coliforms for non-community water systems is as follows:

- (i) A non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in § 141.2) and serving 1,000 persons or fewer must monitor each calendar quarter that the system provides water to the public, except that the State may reduce this monitoring frequency, in writing, if a sanitary survey shows that the system is free of sanitary defects. Beginning June 29, 1994, the State cannot reduce the monitoring frequency for a non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in § 141.2) and serving 1,000 persons or fewer to less than once/year.

- (ii) A non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in § 141.2) and serving more than 1,000 persons during any month must monitor at the same frequency as a like-sized community water system, as specified in paragraph (a)(2) of this section, except the State may reduce this monitoring frequency, in writing, for any month the system serves 1,000 persons or fewer. The State cannot reduce the monitoring frequency to less than once/year. For systems using ground water under the direct influence of surface water, paragraph (a)(3)(iv) of this section applies.
  - (iii) A non-community water system using surface water, in total or in part, must monitor at the same frequency as a like-sized community water system, as specified in paragraph (a)(2) of this section, regardless of the number of persons it serves.
  - (iv) A non-community water system using ground water under the direct influence of surface water, as defined in § 141.2, must monitor at the same frequency as a like-sized community water system, as specified in paragraph (a)(2) of this section. The system must begin monitoring at this frequency beginning six months after the State determines that the ground water is under the direct influence of surface water.
- (4) The public water system must collect samples at regular time intervals throughout the month, except that a system which uses only ground water (except ground water under the direct influence of surface water, as defined in § 141.2), and serves 4,900 persons or fewer, may collect all required samples on a single day if they are taken from different sites.
  - (5) A public water system that uses surface water or ground water under the direct influence of surface water, as defined in § 141.2, and does not practice filtration in compliance with Subpart H must collect at least one sample near the first service connection each day the turbidity level of the source water, measured as specified in § 141.74(b)(2), exceeds 1 NTU. This sample must be analyzed for the presence of total coliforms. When one or more turbidity measurements in any day exceed 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance, unless the State determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection. Sample results from this coliform monitoring must be included in determining compliance with the MCL for total coliforms in § 141.63.
  - (6) Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for total coliforms in § 141.63. Repeat samples taken pursuant to paragraph (b) of this section are not considered special purpose samples, and must be used to determine compliance with the MCL for total coliforms in § 141.63.

(b) **Repeat monitoring.**

- (1) If a routine sample is total coliform-positive, the public water system must collect a set of repeat samples within 24 hours of being notified of the positive result. A system which collects more than one routine sample/month must collect no fewer than three repeat samples for each total coliform-positive sample found. A system which collects one routine sample/month or fewer must collect no fewer than four repeat samples for each total coliform-positive sample found. The State may extend the 24-hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. In the case of an extension, the State must specify how much time the system has to collect the repeat samples.

- (2) The system must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the distribution system, or one away from the end of the distribution system, the State may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site.
- (3) The system must collect all repeat samples on the same day, except that the State may allow a system with a single service connection to collect the required set of repeat samples over a four-day period or to collect a larger volume repeat sample(s) in one or more sample containers of any size, as long as the total volume collected is at least 400 ml (300 ml for systems which collect more than one routine sample/month).
- (4) If one or more repeat samples in the set is total coliform-positive, the public water system must collect an additional set of repeat samples in the manner specified in paragraphs (b) (1)-(3) of this section. The additional samples must be collected within 24 hours of being notified of the positive result, unless the State extends the limit as provided in paragraph (b)(1) of this section. The system must repeat this process until either total coliforms are not detected in one complete set of repeat samples or the system determines that the MCL for total coliforms in § 141.63 has been exceeded and notifies the State.
- (5) If a system collecting fewer than five routine samples/month has one or more total coliform-positive samples and the State does not invalidate the sample(s) under paragraph (c) of this section, it must collect at least five routine samples during the next month the system provides water to the public, except that the State may waive this requirement if the conditions of paragraph (b)(5) (i) or (ii) of this section are met. The State cannot waive the requirement for a system to collect repeat samples in paragraphs (b) (1)-(4) of this section.
  - (i) The State may waive the requirement to collect five routine samples the next month the system provides water to the public if the State, or an agent approved by the State, performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the State to determine whether additional monitoring and/or any corrective action is needed. The State cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the State to perform sanitary surveys.
  - (ii) The State may waive the requirement to collect five routine samples the next month the system provides water to the public if the State has determined why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. In this case, the State must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the State official who recommends such a decision, and make this document available to the EPA and public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem. The State cannot waive the requirement to collect five routine samples the next month the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. Under this paragraph, a system must still take at least one routine sample before the end of the next month it serves water to the public and use it to determine compliance with the MCL for total

coliforms in § 141.63, unless the State has determined that the system has corrected the contamination problem before the system took the set of repeat samples required in paragraphs (b) (1)-(4) of this section, and all repeat samples were total coliform-negative.

- (6) After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.
- (7) Results of all routine and repeat samples not invalidated by the State must be included in determining compliance with the MCL for total coliforms in § 141.63.

(c) **Invalidation of total coliform samples.** A total coliform-positive sample invalidated under this paragraph (c) does not count towards meeting the minimum monitoring requirements of this section.

- (1) The State may invalidate a total coliform-positive sample only if the conditions of paragraph (c)(1) (i), (ii), or (iii) of this section are met.
  - (i) The laboratory establishes that improper sample analysis caused the total coliform-positive result.
  - (ii) The State, on the basis of the results of repeat samples collected as required by paragraphs (b) (1) through (4) of this section, determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The State cannot invalidate a sample 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 (e.g., a State cannot invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the public water system has only one service connection).
  - (iii) The State has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required under paragraphs (b) (1)-(4) of this section, and use them to determine compliance with the MCL for total coliforms in § 141.63. To invalidate a total coliform-positive sample under this paragraph, the decision with the rationale for the decision must be documented in writing, and approved and signed by the supervisor of the State official who recommended the decision. The State must make this document available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take, to correct this problem. The State may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.
- (2) A laboratory must invalidate a total coliform sample (unless total coliforms are detected) if 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), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P-A) Coliform Test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (e.g., Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the

presence of total coliforms. The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The State may waive the 24-hour time limit on a case-by-case basis.

(d) **Sanitary surveys.**

(1)

- (i) Public water systems which do not collect five or more routine samples/month must undergo an initial sanitary survey by June 29, 1994, for community public water systems and June 29, 1999, for non-community water systems. Thereafter, systems must undergo another sanitary survey every five years, except that non-community water systems using only protected and disinfected ground water, as defined by the State, must undergo subsequent sanitary surveys at least every ten years after the initial sanitary survey. The State must review the results of each sanitary survey to determine whether the existing monitoring frequency is adequate and what additional measures, if any, the system needs to undertake to improve drinking water quality.
- (ii) In conducting a sanitary survey of a system using ground water in a State having an EPA-approved wellhead protection program under section 1428 of the Safe Drinking Water Act, information on sources of contamination within the delineated wellhead protection area that was collected in the course of developing and implementing the program should be considered instead of collecting new information, if the information was collected since the last time the system was subject to a sanitary survey.

- (2) Sanitary surveys must be performed by the State or an agent approved by the State. The system is responsible for ensuring the survey takes place.
- (3) Sanitary surveys conducted by the State under the provisions of § 142.16(o)(2) of this chapter may be used to meet the sanitary survey requirements of this section.

(e) **Fecal coliforms/*Escherichia coli* (*E. coli*) testing.**

- (1) If any routine or repeat sample is total coliform-positive, the system must analyze that total coliform-positive culture medium to determine if fecal coliforms are present, except that the system may test for *E. coli* in lieu of fecal coliforms. If fecal coliforms or *E. coli* are present, the system must notify the State by the end of the day when the system is notified of the test result, unless the system is notified of the result after the State office is closed, in which case the system must notify the State before the end of the next business day.
- (2) The State has the discretion to allow a public water system, on a case-by-case basis, to forgo fecal coliform or *E. coli* testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is fecal coliform-positive or *E. coli*-positive. Accordingly, the system must notify the State as specified in paragraph (e)(1) of this section and the provisions of § 141.63(b) apply.

(f) **Analytical methodology.**

- (1) The standard sample volume required for total coliform analysis, regardless of analytical method used, is 100 ml.
- (2) Public water systems need only determine the presence or absence of total coliforms; a determination of total coliform density is not required.

- (3) Public water systems must conduct total coliform analyses in accordance with one of the analytical methods in the following table or one of the alternative methods listed in appendix A to subpart C of this part.

Organism	Methodology <sup>12</sup>	Citation <sup>1</sup>
Total Coliforms <sup>2</sup>	Total Coliform Fermentation Technique <sup>3 4 5</sup> Total Coliform Membrane Filter Technique <sup>6</sup> Presence-Absence (P-A) Coliform Test <sup>5 7</sup> ONPG-MUG Test <sup>8</sup> Colisure Test. <sup>9</sup> E*Colite ® Test. <sup>10</sup> m-ColiBlue24 ® Test. <sup>11</sup> Readycult ® Coliforms 100 Presence/Absence Test. <sup>13</sup> Membrane Filter Technique using Chromocult ® Coliform Agar. <sup>14</sup> Colitag ® Test. <sup>15</sup>	9221A, B. 9222A, B, C. 9221D. 9223.

*The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1, 6, 8, 9, 10, 11, 13, 14 and 15 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800-426-4791. Documents may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington DC 20460 (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).*

<sup>1</sup> Standard Methods for the Examination of Water and Wastewater, 18th edition (1992), 19th edition (1995), or 20th edition (1998). American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005. The cited methods published in any of these three editions may be used. In addition, the following online versions may also be used: 9221 A, B, D-99, 9222 A, B, C-97, and 9223 B-97. Standard Methods Online are available at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only Online versions that may be used.

<sup>2</sup> The time from sample collection to initiation of analysis may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10 deg. C during transit.

<sup>3</sup> Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between this medium and lauryl tryptose broth using the water normally tested, and this comparison demonstrates that the false-positive rate and false-negative rate for total coliform, using lactose broth, is less than 10 percent.

<sup>4</sup> If inverted tubes are used to detect gas production, the media should cover these tubes at least one-half to two-thirds after the sample is added.

<sup>5</sup> No requirement exists to run the completed phase on 10 percent of all total coliform-positive confirmed tubes.

<sup>6</sup> MI agar also may be used. Preparation and use of MI agar is set forth in the article, "New medium for the simultaneous detection of total coliform and *Escherichia coli* in water" by Brenner, K.P., et. al., 1993, Appl. Environ. Microbiol. 59:3534-3544. Also available from the Office of Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460, EPA/600/J-99/225. Verification of colonies is not required.



<sup>7</sup> Six-times formulation strength may be used if the medium is filter-sterilized rather than autoclaved.

<sup>8</sup> The ONPG-MUG Test is also known as the Autoanalysis Collect System.

<sup>9</sup> A description of the Colisure Test, Feb 28, 1994, may be obtained from IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092. The Colisure Test may be read after an incubation time of 24 hours.

<sup>10</sup> A description of the E\*Colite ® Test, "Presence/Absence for Coliforms and E. Coli in Water," Dec 21, 1997, is available from Charm Sciences, Inc., 36 Franklin Street, Malden, MA 02148-4120.

<sup>11</sup> A description of the m-ColiBlue24 ® Test, Aug 17, 1999, is available from the Hach Company, 100 Dayton Avenue, Ames, IA 50010.

<sup>12</sup> EPA strongly recommends that laboratories evaluate the false-positive and negative rates for the method(s) they use for monitoring total coliforms. EPA also encourages laboratories to establish false-positive and false-negative rates within their own laboratory and sample matrix (drinking water or source water) with the intent that if the method they choose has an unacceptable false-positive or negative rate, another method can be used. The Agency suggests that laboratories perform these studies on a minimum of 5% of all total coliform-positive samples, except for those methods where verification/confirmation is already required, e.g., the M-Endo and LES Endo Membrane Filter Tests, Standard Total Coliform Fermentation Technique, and Presence-Absence Coliform Test. Methods for establishing false-positive and negative-rates may be based on lactose fermentation, the rapid test for  $\beta$ -galactosidase and cytochrome oxidase, multi-test identification systems, or equivalent confirmation tests. False-positive and false-negative information is often available in published studies and/or from the manufacturer(s).

<sup>13</sup> The Readycult ® Coliforms 100 Presence/Absence Test is described in the document, "Readycult ® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and Escherichia coli in Finished Waters", November 2000, Version 1.0, available from EM Science (an affiliate of Merck KGaA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027-1297. Telephone number is (800) 222-0342, e-mail address is: [adellenbusch@emscience.com](mailto:adellenbusch@emscience.com).

<sup>14</sup> Membrane Filter Technique using Chromocult ® Coliform Agar is described in the document, "Chromocult ® Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and Escherichia coli in Finished Waters", November 2000, Version 1.0, available from EM Science (an affiliate of Merck KGaA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027-1297. Telephone number is (800) 222-0342, e-mail address is: [adellenbusch@emscience.com](mailto:adellenbusch@emscience.com).

<sup>15</sup> Colitag ® product for the determination of the presence/absence of total coliforms and E. coli is described in "Colitag ® Product as a Test for Detection and Identification of Coliforms and E. coli Bacteria in Drinking Water and Source Water as Required in National Primary Drinking Water Regulations," August 2001, available from CPI International, Inc., 5580 Skylane Blvd., Santa Rosa, CA, 95403, telephone (800) 878-7654, Fax (707) 545-7901, Internet address <http://www.cpiinternational.com>.

(4) [Reserved]

(5) Public water systems must conduct fecal coliform analysis in accordance with the following procedure. When the MTF Technique or Presence-Absence (PA) Coliform Test is used to test for total coliforms, shake the lactose-positive presumptive tube or P-A vigorously and transfer the growth with a sterile 3-mm loop or sterile applicator stick into brilliant green lactose bile broth and

EC medium to determine the presence of total and fecal coliforms, respectively. For EPA-approved analytical methods which use a membrane filter, transfer the total coliform-positive culture by one of the following methods: remove the membrane containing the total coliform colonies from the substrate with a sterile forceps and carefully curl and insert the membrane into a tube of EC medium (the laboratory may first remove a small portion of selected colonies for verification), swab the entire membrane filter surface with a sterile cotton swab and transfer the inoculum to EC medium (do not leave the cotton swab in the EC medium), or inoculate individual total coliform-positive colonies into EC Medium. Gently shake the inoculated tubes of EC medium to insure adequate mixing and incubate in a waterbath at  $44.5 \pm 0.2$  °C for  $24 \pm 2$  hours. Gas production of any amount in the inner fermentation tube of the EC medium indicates a positive fecal coliform test. The preparation of EC medium is described in Method 9221E (paragraph 1a) in Standard Methods for the Examination of Water and Wastewater, 18th edition (1992), 19th edition (1995), and 20th edition (1998); the cited method in any one of these three editions may be used. Public water systems need only determine the presence or absence of fecal coliforms; a determination of fecal coliform density is not required.

- (6) Public water systems must conduct analysis of *Escherichia coli* in accordance with one of the following analytical methods or one of the alternative methods listed in appendix A to subpart C of this part.
- (i) EC medium supplemented with 50 µg/mL of 4-methylumbelliferyl-beta-D-glucuronide (MUG) (final concentration), as described in Method 9222G in Standard Methods for the Examination of Water and Wastewater, 19th edition (1995) and 20th edition (1998). Either edition may be used. Alternatively, the 18th edition (1992) may be used if at least 10 mL of EC medium, as described in paragraph (f)(5) of this section, is supplemented with 50 µg/mL of MUG before autoclaving. The inner inverted fermentation tube may be omitted. If the 18th edition is used, apply the procedure in paragraph (f)(5) of this section for transferring a total coliform-positive culture to EC medium supplemented with MUG, incubate the tube at  $44.5 \pm 0.2$  °C for  $24 \pm 2$  hours, and then observe fluorescence with an ultraviolet light (366 nm) in the dark. If fluorescence is visible, *E. coli* are present.
  - (ii) Nutrient agar supplemented with 100 µg/mL of 4-methylumbelliferyl-beta-D-glucuronide (MUG) (final concentration), as described in Method 9222G in Standard Methods for the Examination of Water and Wastewater, 19th edition (1995) and 20th edition (1998). Either edition may be used for determining if a total coliform-positive sample, as determined by a membrane filter technique, contains *E. coli*. Alternatively, the 18th edition (1992) may be used if the membrane filter containing a total coliform-positive colony(ies) is transferred to nutrient agar, as described in Method 9221B (paragraph 3) of Standard Methods (18th edition), supplemented with 100 µg/mL of MUG. If the 18th edition is used, incubate the agar plate at 35 °C for 4 hours and then observe the colony(ies) under ultraviolet light (366 nm) in the dark for fluorescence. If fluorescence is visible, *E. coli* are present.
  - (iii) Minimal Medium ONPG-MUG (MMO-MUG) Test, as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Detection of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with Presence-Absence Techniques" (Edberg et al.), Applied and Environmental Microbiology, Volume 55, pp. 1003-1008, April 1989. (Note: The Autoanalysis Colilert System is an MMO-MUG test). If the MMO-MUG test is total coliform-positive after a 24-hour incubation, test the medium for fluorescence with a 366-nm ultraviolet light (preferably with a 6-watt lamp) in the dark. If fluorescence is observed, the sample is *E. coli*-positive. If fluorescence is questionable (cannot be definitively read) after 24

hours incubation, incubate the culture for an additional four hours (but not to exceed 28 hours total), and again test the medium for fluorescence. The MMO-MUG Test with hepes buffer in lieu of phosphate buffer is the only approved formulation for the detection of *E. coli*.

- (iv) **The Colisure Test.** A description of the Colisure Test may be obtained from the Millipore Corporation, Technical Services Department, 80 Ashby Road, Bedford, MA 01730.
  - (v) The membrane filter method with MI agar, a description of which is cited in footnote 6 to the table in paragraph (f)(3) of this section.
  - (vi) E\*Colite ® Test, a description of which is cited in footnote 10 to the table at paragraph (f)(3) of this section.
  - (vii) m-ColiBlue24 ® Test, a description of which is cited in footnote 11 to the table in paragraph (f)(3) of this section.
  - (viii) ReadyCult ® Coliforms 100 Presence/Absence Test, a description of which is cited in footnote 13 to the table at paragraph (f)(3) of this section.
  - (ix) Membrane Filter Technique using Chromocult ® Coliform Agar, a description of which is cited in footnote 14 to the table at paragraph (f)(3) of this section.
  - (x) Colitag ®, a description of which is cited in footnote 15 to the table at paragraph (f)(3) of this section.
- (7) As an option to paragraph (f)(6)(iii) of this section, a system with a total coliform-positive, MUG-negative, MMO-MUG test may further analyze the culture for the presence of *E. coli* by transferring a 0.1 ml, 28-hour MMO-MUG culture to EC Medium + MUG with a pipet. The formulation and incubation conditions of EC Medium + MUG, and observation of the results are described in paragraph (f)(6)(i) of this section.
- (8) The following materials are incorporated by reference in this section with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the analytical methods cited in Standard Methods for the Examination of Water and Wastewater (18th, 19th, and 20th editions) may be obtained from the American Public Health Association *et al.*; 1015 Fifteenth Street, NW, Washington, DC 20005-2605. Copies of the MMO-MUG Test, as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg *et al.*) may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, CO 80235. Copies of the MMO-MUG Test as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg *et al.*) may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, CO 80235. A description of the Colisure Test may be obtained from the Millipore Corp., Technical Services Department, 80 Ashby Road, Bedford, MA 01730. Copies may be inspected at EPA's Drinking Water Docket; 401 M St., SW.; Washington, DC 20460, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

(g) **Response to violation.**

- (1) A public water system which has exceeded the MCL for total coliforms in § 141.63 must report the violation to the State no later than the end of the next business day after it learns of the violation, and notify the public in accordance with subpart Q.
- (2) A public water system which has failed to comply with a coliform monitoring requirement, including the sanitary survey requirement, must report the monitoring violation to the State within ten days after the system discovers the violation, and notify the public in accordance with subpart Q.
- (h) The provisions of paragraphs (a) and (d) of this section are applicable until March 31, 2016. The provisions of paragraphs (b), (c), (e), (f), and (g) of this section are applicable until all required repeat monitoring under paragraph (b) of this section and fecal coliform or *E. coli* testing under paragraph (e) of this section that was initiated by a total coliform-positive sample taken before April 1, 2016 is completed, as well as analytical method, reporting, recordkeeping, public notification, and consumer confidence report requirements associated with that monitoring and testing. Beginning April 1, 2016, the provisions of subpart Y of this part are applicable, with systems required to begin regular monitoring at the same frequency as the system-specific frequency required on March 31, 2016.

[54 FR 27562, June 29, 1989]

**Editorial Note:** For FEDERAL REGISTER citations affecting § 141.21, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.govinfo.gov](http://www.govinfo.gov).

## § 141.22 Turbidity sampling and analytical requirements.

The requirements in this section apply to unfiltered systems until December 30, 1991, unless the State has determined prior to that date, in writing pursuant to section 1412(b)(7)(iii), that filtration is required. The requirements in this section apply to filtered systems until June 29, 1993. The requirements in this section apply to unfiltered systems that the State has determined, in writing pursuant to section 1412(b)(7)(C)(iii), must install filtration, until June 29, 1993, or until filtration is installed, whichever is later.

- (a) Samples shall be taken by suppliers of water for both community and non-community water systems at a representative entry point(s) to the water distribution system at least once per day, for the purposes of making turbidity measurements to determine compliance with § 141.13. If the State determines that a reduced sampling frequency in a non-community will not pose a risk to public health, it can reduce the required sampling frequency. The option of reducing the turbidity frequency shall be permitted only in those public water systems that practice disinfection and which maintain an active residual disinfectant in the distribution system, and in those cases where the State has indicated in writing that no unreasonable risk to health existed under the circumstances of this option. Turbidity measurements shall be made as directed in § 141.74(a)(1).
- (b) If the result of a turbidity analysis indicates that the maximum allowable limit has been exceeded, the sampling and measurement shall be confirmed by resampling as soon as practicable and preferably within one hour. If the repeat sample confirms that the maximum allowable limit has been exceeded, the supplier of water shall report to the State within 48 hours. The repeat sample shall be the sample used for the purpose of calculating the monthly average. If the monthly average of the daily samples exceeds the maximum allowable limit, or if the average of two samples taken on consecutive days exceeds 5 TU, the supplier of water shall report to the State and notify the public as directed in § 141.31 and subpart Q.

- (c) Sampling for non-community water systems shall begin within two years after the effective date of this part.
- (d) The requirements of this § 141.22 shall apply only to public water systems which use water obtained in whole or in part from surface sources.
- (e) The State has the authority to determine compliance or initiate enforcement action based upon analytical results or other information compiled by their sanctioned representatives and agencies.

[40 FR 59570, Dec. 24, 1975, as amended at 45 FR 57344, Aug. 27, 1980; 47 FR 8998, Mar. 3, 1982; 47 FR 10998, Mar. 12, 1982; 54 FR 27527, June 29, 1989; 59 FR 62466, Dec. 5, 1994; 65 FR 26022, May 4, 2000]

### § 141.23 Inorganic chemical sampling and analytical requirements.

Community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in § 141.62 in accordance with this section. Non-transient, non-community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in § 141.62 in accordance with this section. Transient, non-community water systems shall conduct monitoring to determine compliance with the nitrate and nitrite maximum contaminant levels in §§ 141.11 and 141.62 (as appropriate) in accordance with this section.

- (a) Monitoring shall be conducted as follows:
  - (1) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point) beginning in the initial compliance period. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
  - (2) Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point) beginning in the initial compliance period. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

Note: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.

- (3) If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (*i.e.*, when water is representative of all sources being used).
- (4) The State may reduce the total number of samples which must be analyzed by allowing the use of compositing. Composite samples from a maximum of five samples are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory.

- (i) If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic chemical, then a follow-up sample must be taken within 14 days at each sampling point included in the composite. These samples must be analyzed for the contaminants which exceeded one-fifth of the MCL in the composite sample. Detection limits for each analytical method and MCLs for each inorganic contaminant are the following:

### DETECTION LIMITS FOR INORGANIC CONTAMINANTS

Contaminant	MCL (mg/l)	Methodology	Detection limit (mg/l)
Antimony	0.006	Atomic Absorption; Furnace	0.003
		Atomic Absorption; Platform	0.0008 <sup>5</sup>
		ICP-Mass Spectrometry	0.0004
		Hydride-Atomic Absorption	0.001
Arsenic	0.010 <sup>6</sup>	Atomic Absorption; Furnace	0.001
		Atomic Absorption; Platform—Stabilized Temperature	0.0005 <sup>7</sup>
		Atomic Absorption; Gaseous Hydride	0.001
		ICP-Mass Spectrometry	0.0014 <sup>8</sup>
Asbestos	7 MFL <sup>1</sup>	Transmission Electron Microscopy	0.01 MFL
Barium	2	Atomic Absorption; furnace technique	0.002
		Atomic Absorption; direct aspiration	0.1
		Inductively Coupled Plasma	0.002 (0.001)
Beryllium	0.004	Atomic Absorption; Furnace	0.0002
		Atomic Absorption; Platform	0.00002 <sup>5</sup>
		Inductively Coupled Plasma <sup>2</sup>	0.0003

<sup>1</sup> MFL = million fibers per liter >10 µm.

<sup>2</sup> Using a 2X preconcentration step as noted in Method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.

<sup>3</sup> Screening method for total cyanides.

<sup>4</sup> Measures “free” cyanides when distillation, digestion, or ligand exchange is omitted.

<sup>5</sup> Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.

<sup>6</sup> The value for arsenic is effective January 23, 2006. Unit then, the MCL is 0.05 mg/L.

<sup>7</sup> The MDL reported for EPA method 200.9 (Atomic Absorption; Platform—Stabilized Temperature) was determined using a 2x concentration step during sample digestion. The MDL determined for samples analyzed using direct analyses (i.e., no sample digestion) will be higher. Using multiple depositions, EPA 200.9 is capable of obtaining MDL of 0.0001 mg/L.

<sup>8</sup> Using selective ion monitoring, EPA Method 200.8 (ICP-MS) is capable of obtaining a MDL of 0.0001 mg/L.

<sup>9</sup> Measures total cyanides when UV-digestor is used, and “free” cyanides when UV-digestor is bypassed.

Contaminant	MCL (mg/l)	Methodology	Detection limit (mg/l)
Cadmium	0.005	ICP-Mass Spectrometry	0.0003
		Atomic Absorption; furnace technique	0.0001
		Inductively Coupled Plasma	0.001
Chromium	0.1	Atomic Absorption; furnace technique	0.001
		Inductively Coupled Plasma	0.007 (0.001)
Cyanide	0.2	Distillation, Spectrophotometric <sup>3</sup>	0.02
		Distillation, Automated, Spectrophotometric <sup>3</sup>	0.005
		Distillation, Amenable, Spectrophotometric <sup>4</sup>	0.02
		Distillation, Selective Electrode <sup>3 4</sup>	0.05
		UV, Distillation, Spectrophotometric <sup>9</sup>	0.0005
		Micro Distillation, Flow Injection, Spectrophotometric <sup>3</sup>	0.0006
		Ligand Exchange with Amperometry <sup>4</sup>	0.0005
		Manual Cold Vapor Technique	0.0002
Mercury	0.002	Automated Cold Vapor Technique	0.0002
Nickel	xl	Atomic Absorption; Furnace	0.001
		Atomic Absorption; Platform	0.0006 <sup>5</sup>
		Inductively Coupled Plasma <sup>2</sup>	0.005
Nitrate	10 (as N)	ICP-Mass Spectrometry	0.0005
		Manual Cadmium Reduction	0.01
		Automated Hydrazine Reduction	0.01
		Automated Cadmium Reduction	0.05
		Ion Selective Electrode	1
		Ion Chromatography	0.01

<sup>1</sup> MFL = million fibers per liter >10 µm.

<sup>2</sup> Using a 2X preconcentration step as noted in Method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.

<sup>3</sup> Screening method for total cyanides.

<sup>4</sup> Measures "free" cyanides when distillation, digestion, or ligand exchange is omitted.

<sup>5</sup> Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.

<sup>6</sup> The value for arsenic is effective January 23, 2006. Unit then, the MCL is 0.05 mg/L.

<sup>7</sup> The MDL reported for EPA method 200.9 (Atomic Absorption; Platform—Stablized Temperature) was determined using a 2x concentration step during sample digestion. The MDL determined for samples analyzed using direct analyses (i.e., no sample digestion) will be higher. Using multiple depositions, EPA 200.9 is capable of obtaining MDL of 0.0001 mg/L.

<sup>8</sup> Using selective ion monitoring, EPA Method 200.8 (ICP-MS) is capable of obtaining a MDL of 0.0001 mg/L.

<sup>9</sup> Measures total cyanides when UV-digestor is used, and "free" cyanides when UV-digestor is bypassed.

Contaminant	MCL (mg/l)	Methodology	Detection limit (mg/l)
Nitrite	1 (as N)	Capillary Ion Electrophoresis	0.076
		Spectrophotometric	0.01
		Automated Cadmium Reduction	0.05
		Manual Cadmium Reduction	0.01
		Ion Chromatography	0.004
Selenium	0.05	Capillary Ion Electrophoresis	0.103
		Atomic Absorption; furnace	0.002
		Atomic Absorption; gaseous hydride	0.002
Thallium	0.002	Atomic Absorption; Furnace	0.001
		Atomic Absorption; Platform	0.0007 <sup>5</sup>
		ICP-Mass Spectrometry	0.0003

<sup>1</sup> MFL = million fibers per liter >10 µm.

<sup>2</sup> Using a 2X preconcentration step as noted in Method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.

<sup>3</sup> Screening method for total cyanides.

<sup>4</sup> Measures "free" cyanides when distillation, digestion, or ligand exchange is omitted.

<sup>5</sup> Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.

<sup>6</sup> The value for arsenic is effective January 23, 2006. Unit then, the MCL is 0.05 mg/L.

<sup>7</sup> The MDL reported for EPA method 200.9 (Atomic Absorption; Platform—Stablized Temperature) was determined using a 2x concentration step during sample digestion. The MDL determined for samples analyzed using direct analyses (i.e., no sample digestion) will be higher. Using multiple depositions, EPA 200.9 is capable of obtaining MDL of 0.0001 mg/L.

<sup>8</sup> Using selective ion monitoring, EPA Method 200.8 (ICP-MS) is capable of obtaining a MDL of 0.0001 mg/L.

<sup>9</sup> Measures total cyanides when UV-digestor is used, and "free" cyanides when UV-digestor is bypassed.

- (ii) If the population served by the system is >3,300 persons, then compositing may only be permitted by the State at sampling points within a single system. In systems serving ≤3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.
- (iii) If duplicates of the original sample taken from each sampling point used in the composite sample are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the State within 14 days after completing analysis of the composite sample, provided the holding time of the sample is not exceeded.



(5) The frequency of monitoring for asbestos shall be in accordance with paragraph (b) of this section: the frequency of monitoring for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be in accordance with paragraph (c) of this section; the frequency of monitoring for nitrate shall be in accordance with paragraph (d) of this section; and the frequency of monitoring for nitrite shall be in accordance with paragraph (e) of this section.

(b) The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in § 141.62(b) shall be conducted as follows:

(1) Each community and non-transient, non-community water system is required to monitor for asbestos during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993.

(2) If the system believes it is not vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos-cement pipe, or both, it may apply to the State for a waiver of the monitoring requirement in paragraph (b)(1) of this section. If the State grants the waiver, the system is not required to monitor.

(3) The State may grant a waiver based on a consideration of the following factors:

(i) Potential asbestos contamination of the water source, and

(ii) The use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.

(4) A waiver remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver must monitor in accordance with the provisions of paragraph (b)(1) of this section.

(5) A system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

(6) A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of paragraph (a) of this section.

(7) A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

(8) A system which exceeds the maximum contaminant levels as determined in § 141.23(i) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.

(9) The State may decrease the quarterly monitoring requirement to the frequency specified in paragraph (b)(1) of this section provided the State has determined that the system is reliably and consistently below the maximum contaminant level. In no case can a State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface (or combined surface/ground) water system takes a minimum of four quarterly samples.

(10) If monitoring data collected after January 1, 1990 are generally consistent with the requirements of § 141.23(b), then the State may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

- (c) The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in § 141.62 for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be as follows:
- (1) Groundwater systems shall take one sample at each sampling point during each compliance period. Surface water systems (or combined surface/ground) shall take one sample annually at each sampling point.
  - (2) The system may apply to the State for a waiver from the monitoring frequencies specified in paragraph (c)(1) of this section. States may grant a public water system a waiver for monitoring of cyanide, provided that the State determines that the system is not vulnerable due to lack of any industrial source of cyanide.
  - (3) A condition of the waiver shall require that a system shall take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one compliance cycle (*i.e.*, nine years).
  - (4) The State may grant a waiver provided surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (At least one sample shall have been taken since January 1, 1990). Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.
  - (5) In determining the appropriate reduced monitoring frequency, the State shall consider:
    - (i) Reported concentrations from all previous monitoring;
    - (ii) The degree of variation in reported concentrations; and
    - (iii) Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.
  - (6) A decision by the State to grant a waiver shall be made in writing and shall set forth the basis for the determination. The determination may be initiated by the State or upon an application by the public water system. The public water system shall specify the basis for its request. The State shall review and, where appropriate, revise its determination of the appropriate monitoring frequency when the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency become available.
  - (7) Systems which exceed the maximum contaminant levels as calculated in § 141.23(i) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.
  - (8) The State may decrease the quarterly monitoring requirement to the frequencies specified in paragraphs (c)(1) and (c)(2) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case can a State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

- (9) All new systems or systems that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the State. The system must also comply with the initial sampling frequencies specified by the State to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.
- (d) All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate in § 141.62.
  - (1) Community and non-transient, non-community water systems served by groundwater systems shall monitor annually beginning January 1, 1993; systems served by surface water shall monitor quarterly beginning January 1, 1993.
  - (2) For community and non-transient, non-community water systems, the repeat monitoring frequency for groundwater systems shall be quarterly for at least one year following any one sample in which the concentration is  $\geq 50$  percent of the MCL. The State may allow a groundwater system to reduce the sampling frequency to annually after four consecutive quarterly samples are reliably and consistently less than the MCL.
  - (3) For community and non-transient, non-community water systems, the State may allow a surface water system to reduce the sampling frequency to annually if all analytical results from four consecutive quarters are  $< 50$  percent of the MCL. A surface water system shall return to quarterly monitoring if any one sample is  $\geq 50$  percent of the MCL.
  - (4) Each transient non-community water system shall monitor annually beginning January 1, 1993.
  - (5) After the initial round of quarterly sampling is completed, each community and non-transient non-community system which is monitoring annually shall take subsequent samples during the quarter(s) which previously resulted in the highest analytical result.
- (e) All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrite in § 141.62(b).
  - (1) All public water systems shall take one sample at each sampling point in the compliance period beginning January 1, 1993 and ending December 31, 1995.
  - (2) After the initial sample, systems where an analytical result for nitrite is  $< 50$  percent of the MCL shall monitor at the frequency specified by the State.
  - (3) For community, non-transient, non-community, and transient non-community water systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is  $\geq 50$  percent of the MCL. The State may allow a system to reduce the sampling frequency to annually after determining the system is reliably and consistently less than the MCL.
  - (4) Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.
- (f) Confirmation samples:

- (1) Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium indicate an exceedance of the maximum contaminant level, the State may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.
  - (2) Where nitrate or nitrite sampling results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample. Systems unable to comply with the 24-hour sampling requirement must immediately notify persons served by the public water system in accordance with § 141.202 and meet other Tier 1 public notification requirements under subpart Q of this part. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.
  - (3) If a State-required confirmation sample is taken for any contaminant, then the results of the initial and confirmation sample shall be averaged. The resulting average shall be used to determine the system's compliance in accordance with paragraph (i) of this section. States have the discretion to delete results of obvious sampling errors.
- (g) The State may require more frequent monitoring than specified in paragraphs (b), (c), (d) and (e) of this section or may require confirmation samples for positive and negative results at its discretion.
- (h) Systems may apply to the State to conduct more frequent monitoring than the minimum monitoring frequencies specified in this section.
- (i) Compliance with § 141.11 or § 141.62(b) (as appropriate) shall be determined based on the analytical result(s) obtained at each sampling point.
- (1) For systems which are conducting monitoring at a frequency greater than annual, compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium is determined by a running annual average at any sampling point. If the average at any sampling point is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample below the method detection limit shall be calculated at zero for the purpose of determining the annual average. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.
  - (2) For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium if the level of a contaminant is greater than the MCL. If confirmation samples are required by the State, the determination of compliance will be based on the annual average of the initial MCL exceedance and any State-required confirmation samples. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.
  - (3) Compliance with the maximum contaminant levels for nitrate and nitrite is determined based on one sample if the levels of these contaminants are below the MCLs. If the levels of nitrate and/or nitrite exceed the MCLs in the initial sample, a confirmation sample is required in accordance with paragraph (f)(2) of this section, and compliance shall be determined based on the average of the initial and confirmation samples.

- (4) Arsenic sampling results will be reported to the nearest 0.001 mg/L.
- (j) Each public water system shall monitor at the time designated by the State during each compliance period.
- (k) Inorganic analysis:
  - (1) Analysis for the following contaminants shall be conducted in accordance with the methods in the following table, or the alternative methods listed in appendix A to subpart C of this part, or their equivalent as determined by EPA. Criteria for analyzing arsenic, barium, beryllium, cadmium, calcium, chromium, copper, lead, nickel, selenium, sodium, and thallium with digestion or directly without digestion, and other analytical test procedures are contained in *Technical Notes on Drinking Water Methods*, EPA-600/R-94-173, October 1994. This document is available from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242-0419 or <http://www.epa.gov/nscep/>.

Contaminant	Methodology <sup>13</sup>	EPA	ASTM <sup>3</sup>	SM <sup>4</sup> (18th, 19th ed.)	SM <sup>4</sup> (20th ed.)	SM Online <sup>22</sup>	Other
1. Alkalinity	Titrimetric		D1067-92, 02 B	2320 B	2320 B	2320 B-97	
	Electrometric titration					I-1030-85 <sup>5</sup>	
2. Antimony	Inductively Coupled Plasma (ICP)—Mass Spectrometry	200.8 <sup>2</sup>					
	Hydride-Atomic Absorption		D3697-92, 02				
	Atomic Absorption; Platform	200.9 <sup>2</sup>					
	Atomic Absorption; Furnace			3113 B		3113 B-99	
3. Arsenic <sup>14</sup>	ICP-Mass Spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Platform	200.9 <sup>2</sup>					
	Atomic Absorption; Furnace		D2972-97, 03 C	3113 B		3113 B-99	
	Hydride Atomic Absorption		D1972-97, 03 B	3114 B		3114 B-97	
4. Asbestos	Transmission Electron Microscopy	100.1 <sup>9</sup>					
	Transmission Electron Microscopy	100.2 <sup>10</sup>					
5. Barium	Inductively Coupled Plasma	200.7 <sup>2</sup>		3120 B	3120 B	3120 B-99	
	ICP-Mass Spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Direct			3111D		3111 D-99	
	Atomic Absorption; Furnace			3113 B		3113 B-99	
6. Beryllium	Inductively Coupled Plasma	200.7 <sup>2</sup>		3120 B	3120 B	3120 B-99	
	ICP-Mass Spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Platform	200.9 <sup>2</sup>					
	Atomic Absorption; Furnace		D3645-97, 03 B	3113 B		3113 B-99	
7. Cadmium	Inductively Coupled Plasma	200.7 <sup>2</sup>					
	ICP-Mass Spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Platform	200.9 <sup>2</sup>					
	Atomic Absorption; Furnace			3113 B		3113 B-99	
8. Calcium	EDTA titrimetric		D511-93, 03 A	3500-Ca D	3500-Ca B	3500-Ca B-97	
	Atomic Absorption; Direct Aspiration		D511-93, 03 B	3111 B		3111 B-99	
	Inductively Coupled Plasma	200.7 <sup>2</sup>		3120 B	3120 B	3120 B-99	
	Ion Chromatography		D6919-03				
9. Chromium	Inductively Coupled Plasma	200.7 <sup>2</sup>		3120 B	3120 B	3120 B-99	
	ICP-Mass Spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Platform	200.9 <sup>2</sup>					
	Atomic Absorption; Furnace			3113 B		3113 B-99	
10. Copper	Atomic Absorption; Furnace		D1688-95, 02 C	3113 B		3113 B-99	
	Atomic Absorption; Direct Aspiration		D1688-95, 02 A	3111 B		3111 B-99	

11. Conductivity	Inductively Coupled Plasma	200.7 <sup>2</sup>		3120 B	3120 B	3120 B-99	
	ICP-Mass spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Platform	200.9 <sup>2</sup>					
12. Cyanide	Conductance		D1125-95 (Reapproved 1999) A	2510 B	2510 B	2510 B-97	
	Manual Distillation followed by		D2036-98 A	4500-CN <sup>-</sup> C	4500-CN <sup>-</sup> C		
	Spectrophotometric, Amenable		D2036-98 B	4500-CN <sup>-</sup> G	4500-CN <sup>-</sup> G	4500-CN <sup>-</sup> G-99	
	Spectro-photometric Manual		D2036-98 A	4500-CN <sup>-</sup> E	4500-CN <sup>-</sup> E	4500-CN <sup>-</sup> E-99	I-3300-85 <sup>5</sup>
	Spectro-photometric Semi-automated	335.4 <sup>6</sup>					
	Selective Electrode			4500-CN <sup>-</sup> F	4500-CN <sup>-</sup> F	4500-CN <sup>-</sup> F-99	
	UV, Distillation, Spectrophotometric						Kelada-01 <sup>17</sup>
	Micro Distillation, Flow Injection, Spectrophotometric						QuikChem 10-204-00-1-X <sup>18</sup>
13. Fluoride	Ligand Exchange and Amperometry <sup>21</sup>		D6888-04				OIA-1677, DW <sup>20</sup>
	Ion Chromatography	300.0 <sup>6</sup> , 300.1 <sup>19</sup>	D4327-97, 03	4110 B	4110 B	4110 B-00	
	Manual Distill.; Color. SPADNS			4500-F <sup>-</sup> B, D	4500-F <sup>-</sup> B, D	4500-F <sup>-</sup> B, D-97	
	Manual Electrode		D1179-93, 99 B	4500-F <sup>-</sup> C	4500-F <sup>-</sup> C	4500-F <sup>-</sup> C-97	
	Automated Electrode						380-75WE <sup>11</sup>
	Automated Alizarin			4500-F <sup>-</sup> E	4500-F <sup>-</sup> E	4500-F <sup>-</sup> E-97	129-71W <sup>11</sup>
14. Lead	Capillary Ion Electrophoresis						D6508, Rev. 2 <sup>23</sup>
	Atomic Absorption; Furnace		D3559-96, 03 D	3113 B		3113 B-99	
	ICP-Mass spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Platform	200.9 <sup>2</sup>					
	Differential Pulse Anodic Stripping Voltametry						Method 1001 <sup>16</sup>
15. Magnesium	Atomic Absorption		D511-93, 03 B	3111 B		3111 B-99	
	ICP	200.7 <sup>2</sup>		3120 B	3120 B	3120 B-99	
	Complexation Titrimetric Methods		D511-93, 03 A	3500-Mg E	3500-Mg B	3500-Mg B-97	
	Ion Chromatography		D6919-03				

16. Mercury	Manual, Cold Vapor	245.1 <sup>2</sup>	D3223-97, 02	3112 B		3112 B-99	
	Automated, Cold Vapor	245.2 <sup>1</sup>					
	ICP-Mass Spectrometry	200.8 <sup>2</sup>					
17. Nickel	Inductively Coupled Plasma	200.7 <sup>2</sup>		3120 B	3120 B	3120 B-99	
	ICP-Mass Spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Platform	200.9 <sup>2</sup>					
18. Nitrate	Atomic Absorption; Direct			3111 B		3111 B-99	
	Atomic Absorption; Furnace			3113 B		3113 B-99	
	Ion Chromatography	300.0 <sup>6</sup> , 300.1 <sup>19</sup>	D4327-97, 03	4110 B	4110 B	4110 B-00	B-1011 <sup>8</sup>
	Automated Cadmium Reduction	353.2 <sup>6</sup>	D3867-90 A	4500-NO <sub>3</sub> <sup>-</sup> F	4500-NO <sub>3</sub> <sup>-</sup> F	4500-NO <sub>3</sub> <sup>-</sup> F-00	
	Ion Selective Electrode			4500-NO <sub>3</sub> <sup>-</sup> D	4500-NO <sub>3</sub> <sup>-</sup> D	4500-NO <sub>3</sub> <sup>-</sup> D-00	601 <sup>7</sup>
	Manual Cadmium Reduction		D3867-90 B	4500-NO <sub>3</sub> <sup>-</sup> E	4500-NO <sub>3</sub> <sup>-</sup> E	4500-NO <sub>3</sub> <sup>-</sup> E-00	
	Capillary Ion Electrophoresis		D6508-00.				
19. Nitrite	Ion Chromatography	300.0 <sup>6</sup> , 300.1 <sup>19</sup>	D4327-97, 03	4110 B	4110 B	4110 B-00	B-1011 <sup>8</sup>
	Automated Cadmium Reduction	353.2 <sup>6</sup>	D3867-90 A	4500-NO <sub>3</sub> <sup>-</sup> F	4500-NO <sub>3</sub> <sup>-</sup> F	4500-NO <sub>3</sub> <sup>-</sup> F-00	
	Manual Cadmium Reduction		D3867-90 B	4500-NO <sub>3</sub> <sup>-</sup> E	4500-NO <sub>3</sub> <sup>-</sup> E	4500-NO <sub>3</sub> <sup>-</sup> E-00	
	Spectrophotometric			4500-NO <sub>2</sub> <sup>-</sup> B	4500-NO <sub>2</sub> <sup>-</sup> B	4500-NO <sub>2</sub> <sup>-</sup> B-00	
	Capillary Ion Electrophoresis		D6508-00				
20. Ortho-phosphate	Colorimetric, Automated, Ascorbic Acid	365.1 <sup>6</sup>		4500-P F	4500-P F		
	Colorimetric, ascorbic acid, single reagent		D515-88 A	4500-P E	4500-P E		
	Colorimetric Phosphomolybdate; Automated-segmented flow; Automated Discrete						I-1601-85 <sup>5</sup> I-2601-90 <sup>5</sup> I-2598-85 <sup>5</sup>
	Ion Chromatography	300.0 <sup>6</sup> , 300.1 <sup>19</sup>	D4327-97, 03	4110 B	4110 B	4110 B-00	
	Capillary Ion Electrophoresis		D6508-00				
21. pH	Electrometric	150.1, 150.2 <sup>1</sup>	D1293-95, 99	4500-H <sup>+</sup> B	4500-H <sup>+</sup> B	4500-H <sup>+</sup> B-00	
22. Selenium	Hydride-Atomic Absorption		D3859-98, 03 A	3114 B		3114 B-97	



23. Silica	ICP-Mass Spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Platform	200.9 <sup>2</sup>					
	Atomic Absorption; Furnace		D3859-98, 03 B	3113 B		3113 B-99	
	Colorimetric, Molybdate Blue						I-1700-85 <sup>5</sup>
	Automated-segmented Flow						I-2700-85 <sup>5</sup>
	Colorimetric		D859-94, 00				
	Molybdosilicate			4500-Si D	4500-SiO <sub>2</sub> C	4500-SiO <sub>2</sub> C-97	
	Heteropoly blue			4500-Si E	4500-SiO <sub>2</sub> D	4500-SiO <sub>2</sub> D-97	
24. Sodium	Automated for Molybdate-reactive Silica			4500-Si F	4500-SiO <sub>2</sub> E	4500-SiO <sub>2</sub> E-97	
	Inductively Coupled Plasma	200.7 <sup>2</sup>		3120 B	3120 B	3120 B-99	
	Inductively Coupled Plasma	200.7 <sup>2</sup>					
	Atomic Absorption; Direct Aspiration			3111 B		3111 B-99	
25. Temperature	Ion Chromatography		D6919-03				
	Thermometric			2550	2550	2550-00	
26. Thallium	ICP-Mass Spectrometry	200.8 <sup>2</sup>					
	Atomic Absorption; Platform	200.9 <sup>2</sup>					

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1-11, 16-20, and 22-23 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800-426-4791. Documents may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., Room 3334, Washington, DC 20460 (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

<sup>1</sup> "Methods for Chemical Analysis of Water and Wastes," EPA/600/4-79/020, March 1983. Available at NTIS, PB84-128677.

<sup>2</sup> "Methods for the Determination of Metals in Environmental Samples—Supplement I," EPA/600/R-94/111, May 1994. Available at NTIS, PB95-125472.

<sup>3</sup> Annual Book of ASTM Standards, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428, <http://www.astm.org>; Annual Book of ASTM Standards 1994, Vols. 11.01 and 11.02; Annual Book of ASTM Standards 1996, Vols. 11.01 and 11.02; Annual Book of ASTM Standards 1999, Vols. 11.01 and 11.02; Annual Book of ASTM Standards 2003, Vols. 11.01 and 11.02.

<sup>4</sup> Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 800 I Street NW., Washington, DC 20001-3710; Standard Methods for the Examination of Water and Wastewater, 18th edition (1992); Standard Methods for the Examination of Water and Wastewater, 19th edition (1995); Standard Methods for the Examination of Water and Wastewater, 20th edition (1998). The following methods from this edition cannot be used: 3111 B, 3111 D, 3113 B, and 3114 B.

<sup>5</sup> U.S. Geological Survey, Federal Center, Box 25286, Denver, CO 80225-0425; Methods for Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediment, Open File Report 93-125, 1993; Techniques of Water Resources Investigation of the U.S. Geological Survey, Book 5, Chapter A-1, 3rd edition, 1989.

<sup>6</sup> "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA/600/R-93/100, August 1993. Available as Technical Report PB94-120821 at National Technical Information Service (NTIS), 5301 Shawnee Road, Alexandria, VA 22312. <http://www.ntis.gov>.

<sup>7</sup> The procedure shall be done in accordance with the Technical Bulletin 601 "Standard Method of Test for Nitrate in Drinking Water," July 1994, PN 221890-001, Analytical Technology, Inc.

Copies may be obtained from ATI Orion, 529 Main Street, Boston, MA 02129.

<sup>8</sup> Method B-1011. "Waters Test Method for Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography," August, 1987. Copies may be obtained from Waters Corporation, Technical Services Division, 34 Maple Street, Milford, MA 01757, Telephone: 508/482-2963, Fax: 508/482-4056.

<sup>9</sup> Method 100.1, "Analytical Method For Determination of Asbestos Fibers in Water," EPA/600/4-83/043, EPA, September 1983. Available at NTIS, PB83-260471.

<sup>10</sup> Method 100.2, "Determination of Asbestos Structure Over 10- $\mu$ m In Length In Drinking Water," EPA/600/R-94/134, June 1994. Available at NTIS, PB94-201902.

<sup>11</sup> Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Technicon Industrial Systems. Copies may be obtained from Bran & Luebbe, 1025 Busch Parkway, Buffalo Grove, IL 60089.

<sup>12</sup> Unfiltered, no digestion or hydrolysis.

<sup>13</sup> Because MDLs reported in EPA Methods 200.7 and 200.9 were determined using a 2x preconcentration step during sample digestion, MDLs determined when samples are analyzed by direct analysis (i.e., no sample digestion) will be higher. For direct analysis of cadmium and arsenic by Method 200.7, and arsenic by Method 3120 B, sample preconcentration using pneumatic nebulization may be required to achieve lower detection limits. Preconcentration may also be required for direct analysis of antimony, lead, and thallium by Method 200.9; antimony and lead by Method 3113 B; and lead by Method D3559-90D, unless multiple in-furnace depositions are made.

<sup>14</sup> If ultrasonic nebulization is used in the determination of arsenic by Method 200.8, the arsenic must be in the pentavalent state to provide uniform signal response. For direct analysis of arsenic with Method 200.8 using ultrasonic nebulization, samples and standards must contain 1 mg/L of sodium hypochlorite.

<sup>15</sup> [Reserved]

<sup>16</sup> The description for Method Number 1001 for lead is available from Palintest, LTD, 21 Kenton Lands Road, P.O. Box 18395, Erlanger, KY 41018. Or from the Hach Company, P.O. Box 389, Loveland, CO 80539.

<sup>17</sup> The description for the Kelada-01 Method, "Kelada Automated Test Methods for Total Cyanide, Acid Dissociable Cyanide, And Thiocyanate," Revision 1.2, August 2001, EPA # 821-B-01-009 for cyanide is available from the National Technical Information Service (NTIS), PB 2001-108275, 5285 Port Royal Road, Springfield, VA 22161. The toll free telephone number is 800-553-6847. NOTE: A 450-W UV lamp may be used in this method instead of the 550-W lamp specified if it provides performance within the quality control (QC) acceptance criteria of the method in a given instrument. Similarly, modified flow cell configurations and flow conditions may be used in the method, provided that the QC acceptance criteria are met.

<sup>18</sup> The description for the QuikChem Method 10-204-00-1-X, "Digestion and distillation of total cyanide in drinking and wastewaters using MICRO DIST and determination of cyanide by flow injection analysis," Revision 2.1, November 30, 2000, for cyanide is available from Lachat Instruments, 6645 W. Mill Rd., Milwaukee, WI 53218. Telephone: 414-358-4200.

<sup>19</sup> "Methods for the Determination of Organic and Inorganic Compounds in Drinking Water," Vol. 1, EPA 815-R-00-014, August 2000. Available as Technical Report PB2000-106981 at National Technical Information Service (NTIS), 5301 Shawnee Road, Alexandria, VA 22312. <http://www.ntis.gov>.

<sup>20</sup> Method OIA-1677, DW "Available Cyanide by Flow Injection, Ligand Exchange, and Amperometry," January 2004. EPA-821-R-04-001, Available from ALPKEM, A Division of OI Analytical, P.O. Box 9010, College Station, TX 77842-9010.

<sup>21</sup> Sulfide levels below those detected using lead acetate paper may produce positive method interferences. Test samples using a more sensitive sulfide method to determine if a sulfide interference is present, and treat samples accordingly.

<sup>22</sup> Standard Methods Online, American Public Health Association, 800 I Street NW., Washington, DC 20001, available at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

- (2) Sample collection for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium, and thallium under this section shall be conducted using the sample preservation, container, and maximum holding time procedures specified in the table below:

Contaminant	Preservative <sup>1</sup>	Container <sup>2</sup>	Time <sup>3</sup>
Antimony	HNO <sup>3</sup>	P or G	6 months
Arsenic	Conc HNO <sub>3</sub> to pH <2	P or G	6 months
Asbestos	4 °C	P or G	48 hours <sup>4</sup>
Barium	HNO <sup>3</sup>	P or G	6 months
Beryllium	HNO <sup>3</sup>	P or G	6 months
Cadmium	HNO <sup>3</sup>	P or G	6 months
Chromium	HNO <sup>3</sup>	P or G	6 months
Cyanide	4 °C, NaOH	P or G	14 days
Fluoride	None	P or G	1 month
Mercury	HNO <sup>3</sup>	P or G	28 days
Nickel	HNO <sup>3</sup>	P or G	6 months
Nitrate	4 °C	P or G	48 hours <sup>5</sup>
Nitrate-Nitrite <sup>6</sup>	H <sup>2</sup> SO <sup>4</sup>	P or G	28 days
Nitrite	4 °C	P or G	48 hours
Selenium	HNO <sup>3</sup>	P or G	6 months
Thallium	HNO <sup>3</sup>	P or G	6 months

<sup>1</sup> For cyanide determinations samples must be adjusted with sodium hydroxide to pH 12 at the time of collection. When chilling is indicated the sample must be shipped and stored at 4 °C or less. Acidification of nitrate or metals samples may be with a concentrated acid or a dilute (50% by volume) solution of the applicable concentrated acid. Acidification of samples for metals analysis is encouraged and allowed at the laboratory rather than at the time of sampling provided the shipping time and other instructions in Section 8.3 of EPA Methods 200.7 or 200.8 or 200.9 are followed.

<sup>2</sup> P = plastic, hard or soft; G = glass, hard or soft.

<sup>3</sup> In all cases samples should be analyzed as soon after collection as possible. Follow additional (if any) information on preservation, containers or holding times that is specified in method.

<sup>4</sup> Instructions for containers, preservation procedures and holding times as specified in Method 100.2 must be adhered to for all compliance analyses including those conducted with Method 100.1.

<sup>5</sup> If the sample is chlorinated, the holding time for an unacidified sample kept at 4 °C is extended to 14 days.

<sup>6</sup> Nitrate-Nitrite refers to a measurement of total nitrate.

- (3) Analysis under this section shall only be conducted by laboratories that have been certified by EPA or the State. Laboratories may conduct sample analysis under provisional certification until January 1, 1996. To receive certification to conduct analyses for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite and selenium and thallium, the laboratory must:

- (i) Analyze Performance Evaluation (PE) samples provided by EPA, the State or by a third party (with the approval of the State or EPA) at least once a year.
- (ii) For each contaminant that has been included in the PE sample and for each method for which the laboratory desires certification achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	Acceptance limit
Antimony	±30 at ≥0.006 mg/1
Arsenic	±30 at ≥0.003 mg/L
Asbestos	2 standard deviations based on study statistics.
Barium	±15% at ≥0.15 mg/1
Beryllium	±15% at ≥0.001 mg/1
Cadmium	±20% at ≥0.002 mg/1
Chromium	±15% at ≥0.01 mg/1
Cyanide	±25% at ≥0.1 mg/1
Fluoride	±10% at ≥1 to 10 mg/1
Mercury	±30% at ≥0.0005 mg/1
Nickel	±15% at ≥0.01 mg/1
Nitrate	±10% at ≥0.4 mg/1
Nitrite	±15% at ≥0.4 mg/1
Selenium	±20% at ≥0.01 mg/1
Thallium	±30% at ≥0.002 mg/1

- (l) Analyses for the purpose of determining compliance with § 141.11 shall be conducted using the requirements specified in paragraphs (l) through (q) of this section.
  - (1) Analyses for all community water systems utilizing surface water sources shall be completed by June 24, 1978. These analyses shall be repeated at yearly intervals.
  - (2) Analyses for all community water systems utilizing only ground water sources shall be completed by June 24, 1979. These analyses shall be repeated at three-year intervals.
  - (3) For non-community water systems, whether supplied by surface or ground sources, analyses for nitrate shall be completed by December 24, 1980. These analyses shall be repeated at intervals determined by the State.
  - (4) The State has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.
- (m) If the result of an analysis made under paragraph (l) of this section indicates that the level of any contaminant listed in § 141.11 exceeds the maximum contaminant level, the supplier of the water shall report to the State within 7 days and initiate three additional analyses at the same sampling point within one month.

- (n) When the average of four analyses made pursuant to paragraph (m) of this section, rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall notify the State pursuant to § 141.31 and give notice to the public pursuant to subpart Q. Monitoring after public notification shall be at a frequency designated by the State and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.
- (o) The provisions of paragraphs (m) and (n) of this section notwithstanding, compliance with the maximum contaminant level for nitrate shall be determined on the basis of the mean of two analyses. When a level exceeding the maximum contaminant level for nitrate is found, a second analysis shall be initiated within 24 hours, and if the mean of the two analyses exceeds the maximum contaminant level, the supplier of water shall report his findings to the State pursuant to § 141.31 and shall notify the public pursuant to subpart Q.
- (p) For the initial analyses required by paragraph (l) (1), (2) or (3) of this section, data for surface waters acquired within one year prior to the effective date and data for ground waters acquired within 3 years prior to the effective date of this part may be substituted at the discretion of the State.
- (q) [Reserved]

[56 FR 3579, Jan. 30, 1991]

**Editorial Note:** For FEDERAL REGISTER citations affecting § 141.23, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.govinfo.gov](http://www.govinfo.gov).

## § 141.24 Organic chemicals, sampling and analytical requirements.

- (a)-(d) [Reserved]
- (e) Analyses for the contaminants in this section shall be conducted using the methods listed in the following table, or the alternative methods listed in appendix A to subpart C of this part, or their equivalent as determined by EPA.
  - (1) The following documents are incorporated by reference. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at EPA's Drinking Water Docket, 1301 Constitution Avenue, NW., EPA West, Room 3334, Washington, DC 20460 (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html). Method 508A and 515.1 are in *Methods for the Determination of Organic Compounds in Drinking Water*, EPA/600/4-88-039, December 1988, Revised, July 1991. Methods 547, 550 and 550.1 are in *Methods for the Determination of Organic Compounds in Drinking Water—Supplement I*, EPA/600-4-90-020, July 1990. Methods 548.1, 549.1, 552.1 and 555 are in *Methods for the Determination of Organic Compounds in Drinking Water—Supplement II*, EPA/600/R-92-129, August 1992. Methods 502.2, 504.1, 505, 506, 507, 508, 508.1, 515.2, 524.2 525.2, 531.1, 551.1 and 552.2 are in *Methods for the Determination of Organic Compounds in Drinking Water—Supplement III*, EPA/600/R-95-131, August 1995. Method 1613 is titled "Tetra-through Octa-Chlorinated Dioxins and Furans by Isotope-Dilution HRGC/HRMS," EPA/821-B-94-005, October 1994. These documents are available from the National Technical Information Service, NTIS PB91-231480,

PB91-146027, PB92-207703, PB95-261616 and PB95-104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll free number is: 800-553-6847. Method 6651 shall be followed in accordance with *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association (APHA); any of these three editions may be used. Method 6610 shall be followed in accordance with *Standard Methods for the Examination of Water and Wastewater*, (18th Edition Supplement) (1994), or with the 19th edition (1995) or 20th edition (1998) of *Standard Methods for the Examination of Water and Wastewater*; any of these publications may be used. The APHA documents are available from APHA, 1015 Fifteenth Street NW., Washington, DC 20005. Other required analytical test procedures germane to the conduct of these analyses are contained in *Technical Notes on Drinking Water Methods*, EPA/600/R-94-173, October 1994, NTIS PB95-104766. EPA Methods 515.3 and 549.2 are available from U.S. Environmental Protection Agency, National Exposure Research Laboratory (NERL)-Cincinnati, 26 West Martin Luther King Drive, Cincinnati, OH 45268. ASTM Method D 5317-93, 98 (Reapproved 2003) is available in the *Annual Book of ASTM Standards*, (1999), Vol. 11.02, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428, any edition containing the cited version of the method may be used. EPA Method 515.4, "Determination of Chlorinated Acids in Drinking Water by Liquid-Liquid Microextraction, Derivatization and Fast Gas Chromatography with Electron Capture Detection," Revision 1.0, April 2000, EPA/815/B-00/001 and EPA Method 552.3, "Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-Liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection," Revision 1.0, July 2003, EPA 815-B-03-002, can be accessed and downloaded directly online at <http://www.epa.gov/safewater/methods/sourcalt.html>. Syngenta Method AG-625, "Atrazine in Drinking Water by Immunoassay," February 2001, is available from Syngenta Crop Protection, Inc., 410 Swing Road, P.O. Box 18300, Greensboro, NC 27419. Telephone: 336-632-6000. Method 531.2 "Measurement of N-

methylcarbamoyloximes and N-methylcarbamates in Water by Direct Aqueous Injection HPLC with Postcolumn Derivatization," Revision 1.0, September 2001, EPA 815-B-01-002, can be accessed and downloaded directly online at <http://www.epa.gov/safewater/methods/sourcalt.html>.

Contaminant	EPA method	Standard methods	ASTM	Other
1. Benzene	502.2, 524.2			
2. Carbon tetrachloride	502.2, 524.2, 551.1			
3. Chlorobenzene	502.2, 524.2			
4. 1,2-Dichlorobenzene	502.2, 524.2			
5. 1,4-Dichlorobenzene	502.2, 524.2			
6. 1,2-Dichloroethane	502.2, 524.2			
7. cis-Dichloroethylene	502.2, 524.2			
8. trans-Dichloroethylene	502.2, 524.2			
9. Dichloromethane	502.2, 524.2			
10. 1,2-Dichloropropane	502.2, 524.2			
11. Ethylbenzene	502.2, 524.2			
12. Styrene	502.2, 524.2			
13. Tetrachloroethylene	502.2, 524.2, 551.1			
14. 1,1,1-Trichloroethane	502.2, 524.2, 551.1			
15. Trichloroethylene	502.2, 524.2, 551.1			
16. Toluene	502.2, 524.2			
17. 1,2,4-Trichlorobenzene	502.2, 524.2			
18. 1,1-Dichloroethylene	502.2, 524.2			
19. 1,1,2-Trichloroethane	502.2, 524.2, 551.1			
20. Vinyl chloride	502.2, 524.2			

<sup>1</sup> [Reserved]

<sup>2</sup> Substitution of the detector specified in Method 505, 507, 508 or 508.1 for the purpose of achieving lower detection limits is allowed as follows. Either an electron capture or nitrogen phosphorous detector may be used provided all regulatory requirements and quality control criteria are met.

<sup>3</sup> PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl. Users of Method 505 may have more difficulty in achieving the required detection limits than users of Methods 508.1, 525.2 or 508.

<sup>4</sup> Accurate determination of the chlorinated esters requires hydrolysis of the sample as described in EPA Methods 515.1, 515.2, 515.3, 515.4 and 555 and ASTM Method D5317-93.

<sup>5</sup> This method may not be used for the analysis of atrazine in any system where chlorine dioxide is used for drinking water treatment. In samples from all other systems, any result for atrazine generated by Method AG-625 that is greater than one-half the maximum contaminant level (MCL) (in other words, greater than 0.0015mg/L or 1.5 µg/L) must be confirmed using another approved method for this contaminant and should use additional volume of the original sample collected for compliance monitoring. In instances where a result from Method AG-625 triggers such confirmatory testing, the confirmatory result is to be used to determine compliance.

Contaminant	EPA method	Standard methods	ASTM	Other
21. Xylenes (total)	502.2, 524.2	6610	D5317-93, 98 (Reapproved 2003) D5317-93, 98 (Reapproved 2003)	Syngenta <sup>5</sup> AG-625
22. 2,3,7,8-TCDD (dioxin)	1613			
23. 2,4-D <sup>4</sup> (as acids, salts, and esters)	515.2, 555, 515.1, 515.3, 515.4			
24. 2,4,5-TP <sup>4</sup> (Silvex)	515.2, 555, 515.1, 515.3, 515.4			
25. Alachlor <sup>2</sup>	507, 525.2, 508.1, 505, 551.1			
26. Atrazine <sup>2</sup>	507, 525.2, 508.1, 505, 551.1			
27. Benzo(a)pyrene	525.2, 550, 550.1			
28. Carbofuran	531.1, 531.2			
29. Chlordane	508, 525.2, 508.1, 505			
30. Dalapon	552.1 515.1, 552.2, 515.3, 515.4, 552.3			
31. Di(2-ethylhexyl)adipate	506, 525.2			
32. Di(2-ethylhexyl)phthalate	506, 525.2			
33. Dibromochloropropane (DBCP)	504.1, 551.1			
34. Dinoseb <sup>4</sup>	515.2, 555, 515.1, 515.3, 515.4			
35. Diquat	549.2			
36. Endothall	548.1			
37. Endrin	508, 525.2, 508.1, 505,			

<sup>1</sup> [Reserved]

<sup>2</sup> Substitution of the detector specified in Method 505, 507, 508 or 508.1 for the purpose of achieving lower detection limits is allowed as follows. Either an electron capture or nitrogen phosphorous detector may be used provided all regulatory requirements and quality control criteria are met.

<sup>3</sup> PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl. Users of Method 505 may have more difficulty in achieving the required detection limits than users of Methods 508.1, 525.2 or 508.

<sup>4</sup> Accurate determination of the chlorinated esters requires hydrolysis of the sample as described in EPA Methods 515.1, 515.2, 515.3, 515.4 and 555 and ASTM Method D5317-93.

<sup>5</sup> This method may not be used for the analysis of atrazine in any system where chlorine dioxide is used for drinking water treatment. In samples from all other systems, any result for atrazine generated by Method AG-625 that is greater than one-half the maximum contaminant level (MCL) (in other words, greater than 0.0015mg/L or 1.5 µg/L) must be confirmed using another approved method for this contaminant and should use additional volume of the original sample collected for compliance monitoring. In instances where a result from Method AG-625 triggers such confirmatory testing, the confirmatory result is to be used to determine compliance.



Contaminant	EPA method	Standard methods	ASTM	Other
38. Ethylene dibromide (EDB)	551.1 504.1, 551.1	6651		
39. Glyphosate	547			
40. Heptachlor	508, 525.2, 508.1, 505, 551.1			
41. Heptachlor Epoxide	508, 525.2, 508.1, 505, 551.1			
42. Hexachlorobenzene	508, 525.2, 508.1, 505, 551.1			
43. Hexachlorocyclopentadiene	508, 525.2, 508.1, 505, 551.1			
44. Lindane	508, 525.2, 508.1, 505, 551.1			
45. Methoxychlor	508, 525.2, 508.1, 505, 551.1	6610		
46. Oxamyl	531.1, 531.2			
47. PCBs <sup>3</sup> (as decachlorobiphenyl)	508A			
48. PCBs <sup>3</sup> (as Aroclors)	508.1, 508, 525.2, 505			
49. Pentachlorophenol	515.2, 525.2, 555, 515.1, 515.3, 515.4			
50. Picloram <sup>4</sup>	515.2, 555, 515.1, 515.3, 515.4		D5317-93, 98 (Reapproved 2003) D5317-93, 98 (Reapproved 2003)	
51. Simazine <sup>2</sup>	507, 525.2, 508.1, 505,			

<sup>1</sup> [Reserved]

<sup>2</sup> Substitution of the detector specified in Method 505, 507, 508 or 508.1 for the purpose of achieving lower detection limits is allowed as follows. Either an electron capture or nitrogen phosphorous detector may be used provided all regulatory requirements and quality control criteria are met.

<sup>3</sup> PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl. Users of Method 505 may have more difficulty in achieving the required detection limits than users of Methods 508.1, 525.2 or 508.

<sup>4</sup> Accurate determination of the chlorinated esters requires hydrolysis of the sample as described in EPA Methods 515.1, 515.2, 515.3, 515.4 and 555 and ASTM Method D5317-93.

<sup>5</sup> This method may not be used for the analysis of atrazine in any system where chlorine dioxide is used for drinking water treatment. In samples from all other systems, any result for atrazine generated by Method AG-625 that is greater than one-half the maximum contaminant level (MCL) (in other words, greater than 0.0015mg/L or 1.5 µg/L) must be confirmed using another approved method for this contaminant and should use additional volume of the original sample collected for compliance monitoring. In instances where a result from Method AG-625 triggers such confirmatory testing, the confirmatory result is to be used to determine compliance.

Contaminant	EPA method	Standard methods	ASTM	Other
52. Toxaphene	551.1 508, 508.1, 525.2, 505			
53. Total Trihalomethanes	502.2, 524.2, 551.1			

<sup>1</sup> [Reserved]

<sup>2</sup> Substitution of the detector specified in Method 505, 507, 508 or 508.1 for the purpose of achieving lower detection limits is allowed as follows. Either an electron capture or nitrogen phosphorous detector may be used provided all regulatory requirements and quality control criteria are met.

<sup>3</sup> PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl. Users of Method 505 may have more difficulty in achieving the required detection limits than users of Methods 508.1, 525.2 or 508.

<sup>4</sup> Accurate determination of the chlorinated esters requires hydrolysis of the sample as described in EPA Methods 515.1, 515.2, 515.3, 515.4 and 555 and ASTM Method D5317-93.

<sup>5</sup> This method may not be used for the analysis of atrazine in any system where chlorine dioxide is used for drinking water treatment. In samples from all other systems, any result for atrazine generated by Method AG-625 that is greater than one-half the maximum contaminant level (MCL) (in other words, greater than 0.0015mg/L or 1.5 µg/L) must be confirmed using another approved method for this contaminant and should use additional volume of the original sample collected for compliance monitoring. In instances where a result from Method AG-625 triggers such confirmatory testing, the confirmatory result is to be used to determine compliance.

(2) [Reserved]

(f) Beginning with the initial compliance period, analysis of the contaminants listed in § 141.61(a) (1) through (21) for the purpose of determining compliance with the maximum contaminant level shall be conducted as follows:

- (1) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.
- (2) Surface water systems (or combined surface/ground) shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.
- (3) If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).
- (4) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in § 141.61(a) (2) through (21) during each compliance period, beginning in the initial compliance period.

- (5) If the initial monitoring for contaminants listed in § 141.61(a) (1) through (8) and the monitoring for the contaminants listed in § 141.61(a) (9) through (21) as allowed in paragraph (f)(18) has been completed by December 31, 1992, and the system did not detect any contaminant listed in § 141.61(a) (1) through (21), then each ground and surface water system shall take one sample annually beginning with the initial compliance period.
- (6) After a minimum of three years of annual sampling, the State may allow groundwater systems with no previous detection of any contaminant listed in § 141.61(a) to take one sample during each compliance period.
- (7) Each community and non-transient non-community ground water system which does not detect a contaminant listed in § 141.61(a) (1) through (21) may apply to the State for a waiver from the requirements of paragraphs (f)(5) and (f)(6) of this section after completing the initial monitoring. (For purposes of this section, detection is defined as  $\geq 0.0005$  mg/l.) A waiver shall be effective for no more than six years (two compliance periods). States may also issue waivers to small systems for the initial round of monitoring for 1,2,4-trichlorobenzene.
- (8) A State may grant a waiver after evaluating the following factor(s):
  - (i) Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the State reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted.
  - (ii) If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.
    - (A) Previous analytical results.
    - (B) The proximity of the system to a potential point or non-point source of contamination. 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.
    - (C) The environmental persistence and transport of the contaminants.
    - (D) The number of persons served by the public water system and the proximity of a smaller system to a larger system.
    - (E) How well the water source is protected against contamination, such as whether it is a surface or groundwater system. Groundwater systems must consider factors such as depth of the well, the type of soil, and wellhead protection. Surface water systems must consider watershed protection.
- (9) As a condition of the waiver a groundwater system must take one sample at each sampling point during the time the waiver is effective (*i.e.*, one sample during two compliance periods or six years) and update its vulnerability assessment considering the factors listed in paragraph (f)(8) of this section. Based on this vulnerability assessment the State must reconfirm that the system is non-vulnerable. If the State does not make this reconfirmation within three years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in paragraph (5) of this section.

- (10) Each community and non-transient non-community surface water system which does not detect a contaminant listed in § 141.61(a) (1) through (21) may apply to the State for a waiver from the requirements of (f)(5) of this section after completing the initial monitoring. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Systems meeting this criterion must be determined by the State to be non-vulnerable based on a vulnerability assessment during each compliance period. Each system receiving a waiver shall sample at the frequency specified by the State (if any).
- (11) If a contaminant listed in § 141.61(a) (2) through (21) is detected at a level exceeding 0.0005 mg/l in any sample, then:
- (i) The system must monitor quarterly at each sampling point which resulted in a detection.
  - (ii) The State may decrease the quarterly monitoring requirement specified in paragraph (f)(11)(i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.
  - (iii) If the State determines that the system is reliably and consistently below the MCL, the State may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result.
  - (iv) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the State for a waiver as specified in paragraph (f)(7) of this section.
  - (v) Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the State may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period. Surface water systems are required to monitor for vinyl chloride as specified by the State.
- (12) Systems which violate the requirements of § 141.61(a) (1) through (21), as determined by paragraph (f)(15) of this section, must monitor quarterly. After a minimum of four consecutive quarterly samples which show the system is in compliance as specified in paragraph (f)(15) of this section the system and the State determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and times specified in paragraph (f)(11)(iii) of this section.
- (13) The State may require a confirmation sample for positive or negative results. If a confirmation sample is required by the State, the result must be averaged with the first sampling result and the average is used for the compliance determination as specified by paragraph (f)(15). States have discretion to delete results of obvious sampling errors from this calculation.

- (14) The State may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.
- (i) If the concentration in the composite sample is greater than or equal to 0.0005 mg/l for any contaminant listed in § 141.61(a), then a follow-up sample must be taken within 14 days at each sampling point included in the composite, and be analyzed for that contaminant.
  - (ii) If duplicates of the original sample taken from each sampling point used in the composite sample are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the State within 14 days after completing analysis of the composite sample, provided the holding time of the sample is not exceeded.
  - (iii) If the population served by the system is >3,300 persons, then compositing may only be permitted by the State at sampling points within a single system. In systems serving ≤3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.
  - (iv) Compositing samples prior to GC analysis.
    - (A) Add 5 ml or equal larger amounts of each sample (up to 5 samples are allowed) to a 25 ml glass syringe. Special precautions must be made to maintain zero headspace in the syringe.
    - (B) The samples must be cooled at 4 °C during this step to minimize volatilization losses.
    - (C) Mix well and draw out a 5-ml aliquot for analysis.
    - (D) Follow sample introduction, purging, and desorption steps described in the method.
    - (E) If less than five samples are used for compositing, a proportionately small syringe may be used.
  - (v) Compositing samples prior to GC/MS analysis.
    - (A) Inject 5-ml or equal larger amounts of each aqueous sample (up to 5 samples are allowed) into a 25-ml purging device using the sample introduction technique described in the method.
    - (B) The total volume of the sample in the purging device must be 25 ml.
    - (C) Purge and desorb as described in the method.
- (15) Compliance with § 141.61(a) (1) through (21) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.
- (i) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.
  - (ii) Systems monitoring annually or less frequently whose sample result exceeds the MCL must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.

- (iii) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.
  - (iv) If a system fails to collect the required number of samples, compliance will be based on the total number of samples collected.
  - (v) If a sample result is less than the detection limit, zero will be used to calculate the annual average.
- (16) [Reserved]
- (17) Analysis under this section shall only be conducted by laboratories that are certified by EPA or the State according to the following conditions (laboratories may conduct sample analysis under provisional certification until January 1, 1996):
- (i) To receive certification to conduct analyses for the contaminants in § 141.61(a) (2) through (21) the laboratory must:
    - (A) Analyze Performance Evaluation (PE) samples provided by EPA, the State, or by a third party (with the approval of the State or EPA) at least once a year by each method for which the laboratory desires certification.
    - (B) Achieve the quantitative acceptance limits under paragraphs (f)(17)(i)(C) and (D) of this section for at least 80 percent of the regulated organic contaminants included in the PE sample.
    - (C) Achieve quantitative results on the analyses performed under paragraph (f)(17)(i)(A) of this section that are within  $\pm 20\%$  of the actual amount of the substances in the Performance Evaluation sample when the actual amount is greater than or equal to 0.010 mg/l.
    - (D) Achieve quantitative results on the analyses performed under paragraph (f)(17)(i)(A) of this section that are within  $\pm 40\%$  percent of the actual amount of the substances in the Performance Evaluation sample when the actual amount is less than 0.010 mg/l.
    - (E) Achieve a method detection limit of 0.0005 mg/l, according to the procedures in appendix B of part 136.
  - (ii) To receive certification to conduct analyses for vinyl chloride, the laboratory must:
    - (A) Analyze Performance Evaluation (PE) samples provided by EPA, the State, or by a third party (with the approval of the State or EPA) at least once a year by each method for which the laboratory desires certification.
    - (B) Achieve quantitative results on the analyses performed under paragraph (f)(17)(ii)(A) of this section that are within  $\pm 40\%$  percent of the actual amount of vinyl chloride in the Performance Evaluation sample.
    - (C) Achieve a method detection limit of 0.0005 mg/l, according to the procedures in appendix B of part 136.
    - (D) Obtain certification for the contaminants listed in § 141.61(a)(2) through (21).

- (18) States may allow the use of monitoring data collected after January 1, 1988, required under section 1445 of the Act for purposes of initial monitoring compliance. If the data are generally consistent with the other requirements of this section, the State may use these data (*i.e.*, a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of paragraph (f)(4) of this section. Systems which use grandfathered samples and did not detect any contaminant listed § 141.61(a)(2) through (21) shall begin monitoring annually in accordance with paragraph (f)(5) of this section beginning with the initial compliance period.
- (19) States may increase required monitoring where necessary to detect variations within the system.
- (20) Each certified laboratory must determine the method detection limit (MDL), as defined in appendix B to part 136, at which it is capable of detecting VOCs. The acceptable MDL is 0.0005 mg/l. This concentration is the detection concentration for purposes of this section.
- (21) Each public water system shall monitor at the time designated by the State within each compliance period.
- (22) All new systems or systems that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the State. The system must also comply with the initial sampling frequencies specified by the State to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

(g) [Reserved]

(h) Analysis of the contaminants listed in § 141.61(c) for the purposes of determining compliance with the maximum contaminant level shall be conducted as follows, with the exceptions that this paragraph (h) does not apply to regulated PFAS (see § 141.902) and no monitoring is required for aldicarb, aldicarb sulfoxide, or aldicarb sulfone:

- (1) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
- (2) Surface water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

Note: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.

- (3) If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (*i.e.*, when water representative of all sources is being used).

(4) **Monitoring frequency:**

- (i) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in § 141.61(c) during each compliance period beginning with the initial compliance period.

- (ii) Systems serving more than 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of two quarterly samples in one year during each repeat compliance period.
  - (iii) Systems serving less than or equal to 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of one sample during each repeat compliance period.
- (5) Each community and non-transient water system may apply to the State for a waiver from the requirement of paragraph (h)(4) of this section. A system must reapply for a waiver for each compliance period.
- (6) A State may grant a waiver after evaluating the following factor(s): Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the State reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted. If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.
  - (i) Previous analytical results.
  - (ii) The proximity of the system to a potential point or non-point source of contamination. 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. 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.
  - (iii) The environmental persistence and transport of the pesticide or PCBs.
  - (iv) How well the water source is protected against contamination due to such factors as depth of the well and the type of soil and the integrity of the well casing.
  - (v) Elevated nitrate levels at the water supply source.
  - (vi) Use of PCBs in equipment used in the production, storage, or distribution of water (*i.e.*, PCBs used in pumps, transformers, etc.).
- (7) If an organic contaminant listed in § 141.61(c) is detected (as defined by paragraph (h)(18) of this section) in any sample, then:
  - (i) Each system must monitor quarterly at each sampling point which resulted in a detection.
  - (ii) The State may decrease the quarterly monitoring requirement specified in paragraph (h)(7)(i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.
  - (iii) After the State determines the system is reliably and consistently below the maximum contaminant level the State may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter that previously yielded the highest analytical result.



- (iv) Systems which have 3 consecutive annual samples with no detection of a contaminant may apply to the State for a waiver as specified in paragraph (h)(6) of this section.
  - (v) If the monitoring results in detection of one or more of certain related contaminants (heptachlor and heptachlor epoxide), then subsequent monitoring shall analyze for all related contaminants.
- (8) Systems which violate the requirements of § 141.61(c) as determined by paragraph (h)(11) of this section must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the State determines the system is reliably and consistently below the MCL, as specified in paragraph (h)(11) of this section, the system shall monitor at the frequency specified in paragraph (h)(7)(iii) of this section.
- (9) The State may require a confirmation sample for positive or negative results. If a confirmation sample is required by the State, the result must be averaged with the first sampling result and the average used for the compliance determination as specified by paragraph (h)(11) of this section. States have discretion to delete results of obvious sampling errors from this calculation.
- (10) The State may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.
- (i) If the concentration in the composite sample detects one or more contaminants listed in § 141.61(c), then a follow-up sample must be taken within 14 days at each sampling point included in the composite, and be analyzed for that contaminant.
  - (ii) If duplicates of the original sample taken from each sampling point used in the composite sample are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the State within 14 days after completion of the composite analysis or before the holding time for the initial sample is exceeded whichever is sooner.
  - (iii) If the population served by the system is >3,300 persons, then compositing may only be permitted by the State at sampling points within a single system. In systems serving ≤3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.
- (11) Compliance with § 141.61(c) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.
- (i) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.
  - (ii) Systems monitoring annually or less frequently whose sample result exceeds the regulatory detection level as defined by paragraph (h)(18) of this section must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.
  - (iii) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.

- (iv) If a system fails to collect the required number of samples, compliance will be based on the total number of samples collected.
- (v) If a sample result is less than the detection limit, zero will be used to calculate the annual average.
- (12) [Reserved]
- (13) Analysis for PCBs shall be conducted as follows using the methods in paragraph (e) of this section:
  - (i) Each system which monitors for PCBs shall analyze each sample using either Method 508.1, 525.2, 508 or 505. Users of Method 505 may have more difficulty in achieving the required Aroclor detection limits than users of Methods 508.1, 525.2 or 508.
  - (ii) If PCBs (as one of seven Aroclors) are detected (as designated in this paragraph) in any sample analyzed using Method 505 or 508, the system shall reanalyze the sample using Method 508A to quantitate PCBs (as decachlorobiphenyl).

Aroclor	Detection limit (mg/l)
1016	0.00008
1221	0.02
1232	0.0005
1242	0.0003
1248	0.0001
1254	0.0001
1260	0.0002

- (iii) Compliance with the PCB MCL shall be determined based upon the quantitative results of analyses using Method 508A.
- (14) If monitoring data collected after January 1, 1990, are generally consistent with the requirements of § 141.24(h), then the State may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.
- (15) The State may increase the required monitoring frequency, where necessary, to detect variations within the system (e.g., fluctuations in concentration due to seasonal use, changes in water source).
- (16) The State has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.
- (17) Each public water system shall monitor at the time designated by the State within each compliance period.

- (18) Detection as used in this paragraph shall be defined as greater than or equal to the following concentrations for each contaminant.

Contaminant	Detection limit (mg/l)
Alachlor	.0002
Aldicarb	.0005
Aldicarb sulfoxide	.0005
Aldicarb sulfone	.0008
Atrazine	.0001
Benzo[a]pyrene	.00002
Carbofuran	.0009
Chlordane	.0002
Dalapon	.001
1,2-Dibromo-3-chloropropane (DBCP)	.00002
Di (2-ethylhexyl) adipate	.0006
Di (2-ethylhexyl) phthalate	.0006
Dinoseb	.0002
Diquat	.0004
2,4-D	.0001
Endothall	.009
Endrin	.00001
Ethylene dibromide (EDB)	.00001
Glyphosate	.006
Heptachlor	.00004
Heptachlor epoxide	.00002
Hexachlorobenzene	.0001
Hexachlorocyclopentadiene	.0001
Lindane	.00002
Methoxychlor	.0001
Oxamyl	.002
Picloram	.0001
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	.0001
Pentachlorophenol	.00004
Simazine	.00007
Toxaphene	.001
2,3,7,8-TCDD (Dioxin)	.000000005
2,4,5-TP (Silvex)	.0002

- (19) Analysis under this section shall only be conducted by laboratories that have received certification by EPA or the State and have met the following conditions:

- (i) To receive certification to conduct analyses for the contaminants in § 141.61(c) the laboratory must:
- (A) Analyze Performance Evaluation (PE) samples provided by EPA, the State, or by a third party (with the approval of the State or EPA) at least once a year by each method for which the laboratory desires certification.
  - (B) For each contaminant that has been included in the PE sample achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	Acceptance limits (percent)
DBCP	±40
EDB	±40.
Alachlor	±45.
Atrazine	±45.
Benzo[a]pyrene	2 standard deviations.
Carbofuran	±45.
Chlordane	±45.
Dalapon	2 standard deviations.
Di(2-ethylhexyl)adipate	2 standard deviations.
Di(2-ethylhexyl)phthalate	2 standard deviations.
Dinoseb	2 standard deviations.
Diquat	2 standard deviations.
Endothall	2 standard deviations.
Endrin	±30.
Glyphosate	2 standard deviations.
Heptachlor	±45.
Heptachlor epoxide	±45.
Hexachlorobenzene	2 standard deviations.
Hexachloro- cyclopentadiene	2 standard deviations.
Lindane	±45.
Methoxychlor	±45.
Oxamyl	2 standard deviations.
PCBs (as Decachlorobiphenyl)	0-200.
Picloram	2 standard deviations.
Simazine	2 standard deviations.
Toxaphene	±45.
Aldicarb	2 standard deviations.
Aldicarb sulfoxide	2 standard deviations.
Aldicarb sulfone	2 standard deviations.
Pentachlorophenol	±50.
2,3,7,8-TCDD (Dioxin)	2 standard deviations.

Contaminant	Acceptance limits (percent)
2,4-D	±50.
2,4,5-TP (Silvex)	±50.

(ii) [Reserved]

- (20) All new systems or systems that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the State. The system must also comply with the initial sampling frequencies specified by the State to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

*(Approved by the Office of Management and Budget under control number 2040-0090)*

*[40 FR 59570, Dec. 24, 1975]*

**Editorial Note:** For FEDERAL REGISTER citations affecting § 141.24, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.govinfo.gov](http://www.govinfo.gov).

### § 141.25 Analytical methods for radioactivity.

- (a) Analysis for the following contaminants shall be conducted to determine compliance with § 141.66 (radioactivity) in accordance with the methods in the following table, or the alternative methods listed in appendix A to subpart C this part, or their equivalent determined by EPA in accordance with § 141.27.

Contaminant	Methodology	Reference (Method of Page Number)								
		EPA <sup>1</sup>	EPA <sup>2</sup>	EPA <sup>3</sup>	EPA <sup>4</sup>	SM <sup>5</sup>	ASTM <sup>6</sup>	USGS <sup>7</sup>	DOE <sup>8</sup>	Other

Naturally Occurring:

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of documents 1 through 10 and 13 through 14 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800-426-4791. Documents may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., Room 3334, Washington, DC 20460 (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

<sup>1</sup> "Prescribed Procedures for the Measurement of Radioactivity in Drinking Water," EPA 600/4-80-032, August 1980. Available at the U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161 (Telephone 800-553-6847), PB 80-224744.

<sup>2</sup> "Interim Radiochemical Methodology for Drinking Water," EPA 600/4-75-008 (revised), March 1976. Available NTIS, *ibid*.

<sup>3</sup> "Radiochemistry Procedures Manual," EPA 520/5-84-006, December 1987. Available NTIS, *ibid*.

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<sup>6</sup> Annual Book of ASTM Standards, Vol. 11.01 and 11.02, 2002; ASTM International; any year containing the cited version of the method may be used. Copies of these two volumes and the 2003 version of D 5673-03 may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

<sup>7</sup> "Methods for Determination of Radioactive Substances in Water and Fluvial Sediments," Chapter A5 in Book 5 of Techniques of Water-Resources Investigations of the United States Geological Survey, 1977. Available at U.S. Geological Survey (USGS) Information Services, Box 25286, Federal Center, Denver, CO 80225-0425.

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<sup>9</sup> "Determination of Ra-226 and Ra-228 (Ra-02)," January 1980, Revised June 1982. Available at Radiological Sciences Institute for Laboratories and Research, New York State Department of Health, Empire State Plaza, Albany, NY 12201.

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<sup>11</sup> Natural uranium and thorium-230 are approved as gross alpha calibration standards for gross alpha with co-precipitation and evaporation methods; americium-241 is approved with co-precipitation methods.

<sup>12</sup> If uranium (U) is determined by mass, a 0.67 pCi/μg of uranium conversion factor must be used. This conversion factor is based on the 1:1 activity ratio of U-234 and U-238 that is characteristic of naturally occurring uranium.

<sup>13</sup> "Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry," Revision 5.4, which is published in "Methods for the Determination of Metals in Environmental Samples—Supplement I," EPA 600-R-94-111, May 1994. Available at NTIS, PB 95-125472.

<sup>14</sup> "The Determination of Radium-226 and Radium-228 in Drinking Water by Gamma-ray Spectrometry Using HPGE or Ge(Li) Detectors," Revision 1.2, December 2004. Available from the Environmental Resources Center, Georgia Institute of Technology, 620 Cherry Street, Atlanta, GA 30332-0335, USA, Telephone: 404-894-3776. This method may be used to analyze for radium-226 and radium-228 in samples collected after January 1, 2005 to satisfy the radium-226 and radium-228 monitoring requirements specified at 40 CFR 141.26.

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Gross alpha <sup>11</sup> and beta	Evaporation	900.0	p. 1	00-01	p. 1	302, 7110 B, 7110 B-00		R-1120-76		

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Gross alpha <sup>11</sup>	Coprecipitation			00-02		7110 C, 7110 C-00				

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Radium 226	Radon emanation	903.1	p. 16	Ra-04	p. 19	305, 7500-Ra C, 7500-Ra C-01	D3454-97	R-1141-76	Ra-04	NY <sup>9</sup> ,

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	Radiochemical	903.0	p. 13	Ra-03		304, 7500-Ra B, 7500-Ra B-01	D2460-97	R-1140-76		GA <sup>14</sup>

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<sup>11</sup> Natural uranium and thorium-230 are approved as gross alpha calibration standards for gross alpha with co-precipitation and evaporation methods; americium-241 is approved with co-precipitation methods.

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Radium 228	Radiochemical	904.0	p. 24	Ra-05	p. 19	7500-Ra D, 7500-Ra D-01		R-1142-76		NY <sup>9</sup> ,

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	Fluorometric	908.1				7500-U C (17th Ed.)	D2907-97	R-1180-76,	U-04	

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	Laser						D5174-97, 02			

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Radioactive Cesium	Radiochemical	901.0	p. 4			7500-Cs B, 7500-Cs B-00	D2459-72	R-1111-76		

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	Gamma Ray	901.1			p. 92	7120, 7120-97	D3649-91, 98a	R-1110-76	4.5.2.3	

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	Gamma Ray	901.1			p. 92	7120, 7120-97	D4785-93, 00a		4.5.2.3	

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Radioactive Strontium	Radiochemical	905.0	p. 29	Sr-04	p. 65	303, 7500-Sr B, 7500-Sr B-01		R-1160-76	Sr-01,	

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Tritium	Liquid Scintillation	906.0	p. 34	H-02	p. 87	306, 7500- <sup>3</sup> H B, 7500- <sup>3</sup> H B-00	D4107-91, 98 (Reapproved	R-1171-76		

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Gamma Emitters	Gamma Ray	901.1			p. 92	7120, 7120-97	D3649-91, 98a	R-1110-76	Ga-01-R	

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<sup>7</sup> "Methods for Determination of Radioactive Substances in Water and Fluvial Sediments," Chapter A5 in Book 5 of Techniques of Water-Resources Investigations of the United States Geological Survey, 1977. Available at U.S. Geological Survey (USGS) Information Services, Box 25286, Federal Center, Denver, CO 80225-0425.

<sup>8</sup> "EML Procedures Manual," 28th (1997) or 27th (1990) Editions, Volumes 1 and 2; either edition may be used. In the 27th Edition Method Ra-04 is listed as Ra-05 and Method Ga-01-R is listed as Sect. 4.5.2.3. Available at the Environmental Measurements Laboratory, U.S. Department of Energy (DOE), 376 Hudson Street, New York, NY 10014-3621.

<sup>9</sup> "Determination of Ra-226 and Ra-228 (Ra-02)," January 1980, Revised June 1982. Available at Radiological Sciences Institute for Laboratories and Research, New York State Department of Health, Empire State Plaza, Albany, NY 12201.

<sup>10</sup> "Determination of Radium 228 in Drinking Water," August 1980. Available at State of New Jersey, Department of Environmental Protection, Division of Environmental Quality, Bureau of Radiation and Inorganic Analytical Services, 9 Ewing Street, Trenton, NJ 08625.

<sup>11</sup> Natural uranium and thorium-230 are approved as gross alpha calibration standards for gross alpha with co-precipitation and evaporation methods; americium-241 is approved with co-precipitation methods.

<sup>12</sup> If uranium (U) is determined by mass, a 0.67 pCi/μg of uranium conversion factor must be used. This conversion factor is based on the 1:1 activity ratio of U-234 and U-238 that is characteristic of naturally occurring uranium.

<sup>13</sup> "Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry," Revision 5.4, which is published in "Methods for the Determination of Metals in Environmental Samples—Supplement I," EPA 600-R-94-111, May 1994. Available at NTIS, PB 95-125472.

<sup>14</sup> "The Determination of Radium-226 and Radium-228 in Drinking Water by Gamma-ray Spectrometry Using HPGE or Ge(Li) Detectors," Revision 1.2, December 2004. Available from the Environmental Resources Center, Georgia Institute of Technology, 620 Cherry Street, Atlanta, GA 30332-0335, USA, Telephone: 404-894-3776. This method may be used to analyze for radium-226 and radium-228 in samples collected after January 1, 2005 to satisfy the radium-226 and radium-228 monitoring requirements specified at 40 CFR 141.26.

Contaminant	Methodology	Reference (Method of Page Number)								
		EPA <sup>1</sup>	EPA <sup>2</sup>	EPA <sup>3</sup>	EPA <sup>4</sup>	SM <sup>5</sup>	ASTM <sup>6</sup>	USGS <sup>7</sup>	DOE <sup>8</sup>	Other
		901.0				7500-I B, 7500-I B-00				

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of documents 1 through 10 and 13 through 14 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800-426-4791. Documents may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW, Room 3334, Washington, DC 20460 (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

<sup>1</sup> "Prescribed Procedures for the Measurement of Radioactivity in Drinking Water," EPA 600/4-80-032, August 1980. Available at the U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161 (Telephone 800-553-6847), PB 80-224744.

<sup>2</sup> "Interim Radiochemical Methodology for Drinking Water," EPA 600/4-75-008 (revised), March 1976. Available NTIS, *ibid*.

<sup>3</sup> "Radiochemistry Procedures Manual," EPA 520/5-84-006, December 1987. Available NTIS, *ibid*.

<sup>4</sup> "Radiochemical Analytical Procedures for Analysis of Environmental Samples," March 1979. Available at NTIS, *ibid*. EMSL LV 053917.

<sup>5</sup> "Standard Methods for the Examination of Water and Wastewater," 13th, 17th, 18th, 19th or 20th edition, 1971, 1989, 1992, 1995, 1998. Available at American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005. Methods 302, 303, 304, 305 and 306 are only in the 13th edition. Methods 7110B, 7500-Ra B, 7500-Ra C, 7500-Ra D, 7500-U B, 7500-Cs B, 7500-I B, 7500-I C, 7500-I D, 7500-Sr B, and 7500-<sup>3</sup> H B are in the 17th, 18th, 19th and 20th editions. Method 7110 C is in the 18th, 19th and 20th editions. Method 7500-U C Fluorometric Uranium is only in the 17th Edition, and 7500-U C Alpha spectrometry is only in the 18th, 19th and 20th editions. Method 7120 is only in the 19th and 20th editions. Method 3125 is only in the 20th edition. Methods 7110 B-00, 7110 C-00, 7500-Ra B-01, 7500-Ra C-01, 7500-Ra D-01, 7500-U B-00, 7500-U C-00, 7500-I B-00, 7500-I C-00, 7500-I D-00, 7120-97, 7500-Sr B-01, and 7500-<sup>3</sup> H B-00 are available online at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

<sup>6</sup> Annual Book of ASTM Standards, Vol. 11.01 and 11.02, 2002; ASTM International; any year containing the cited version of the method may be used. Copies of these two volumes and the 2003 version of D 5673-03 may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

<sup>7</sup> "Methods for Determination of Radioactive Substances in Water and Fluvial Sediments," Chapter A5 in Book 5 of Techniques of Water-Resources Investigations of the United States Geological Survey, 1977. Available at U.S. Geological Survey (USGS) Information Services, Box 25286, Federal Center, Denver, CO 80225-0425.

<sup>8</sup> "EML Procedures Manual," 28th (1997) or 27th (1990) Editions, Volumes 1 and 2; either edition may be used. In the 27th Edition Method Ra-04 is listed as Ra-05 and Method Ga-01-R is listed as Sect. 4.5.2.3. Available at the Environmental Measurements Laboratory, U.S. Department of Energy (DOE), 376 Hudson Street, New York, NY 10014-3621.

<sup>9</sup> "Determination of Ra-226 and Ra-228 (Ra-02)," January 1980, Revised June 1982. Available at Radiological Sciences Institute for Laboratories and Research, New York State Department of Health, Empire State Plaza, Albany, NY 12201.

<sup>10</sup> "Determination of Radium 228 in Drinking Water," August 1980. Available at State of New Jersey, Department of Environmental Protection, Division of Environmental Quality, Bureau of Radiation and Inorganic Analytical Services, 9 Ewing Street, Trenton, NJ 08625.

<sup>11</sup> Natural uranium and thorium-230 are approved as gross alpha calibration standards for gross alpha with co-precipitation and evaporation methods; americium-241 is approved with co-precipitation methods.

<sup>12</sup> If uranium (U) is determined by mass, a 0.67 pCi/μg of uranium conversion factor must be used. This conversion factor is based on the 1:1 activity ratio of U-234 and U-238 that is characteristic of naturally occurring uranium.

<sup>13</sup> "Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry," Revision 5.4, which is published in "Methods for the Determination of Metals in Environmental Samples—Supplement I," EPA 600-R-94-111, May 1994. Available at NTIS, PB 95-125472.

<sup>14</sup> "The Determination of Radium-226 and Radium-228 in Drinking Water by Gamma-ray Spectrometry Using HPGE or Ge(Li) Detectors," Revision 1.2, December 2004. Available from the Environmental Resources Center, Georgia Institute of Technology, 620 Cherry Street, Atlanta, GA 30332-0335, USA, Telephone: 404-894-3776. This method may be used to analyze for radium-226 and radium-228 in samples collected after January 1, 2005 to satisfy the radium-226 and radium-228 monitoring requirements specified at 40 CFR 141.26.

- (b) When the identification and measurement of radionuclides other than those listed in paragraph (a) of this section is required, the following references are to be used, except in cases where alternative methods have been approved in accordance with § 141.27.
- (1) *Procedures for Radiochemical Analysis of Nuclear Reactor Aqueous Solutions*, H. L. Krieger and S. Gold, EPA-R4-73-014. USEPA, Cincinnati, Ohio, May 1973.
  - (2) *HASL Procedure Manual*, Edited by John H. Harley. HASL 300, ERDA Health and Safety Laboratory, New York, NY., 1973.
- (c) For the purpose of monitoring radioactivity concentrations in drinking water, the required sensitivity of the radioanalysis is defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus 100 percent at the 95 percent confidence level ( $1.96\sigma$  where  $\sigma$  is the standard deviation of the net counting rate of the sample).
- (1) To determine compliance with § 141.66(b), (c), and (e) the detection limit shall not exceed the concentrations in Table B to this paragraph.

**TABLE B—DETECTION LIMITS FOR GROSS ALPHA PARTICLE ACTIVITY, RADIUM 226, RADIUM 228, AND URANIUM**

Contaminant	Detection limit
Gross alpha particle activity	3 pCi/L.
Radium 226	1 pCi/L.
Radium 228	1 pCi/L.
Uranium	1 µg/L

- (2) To determine compliance with § 141.66(d) the detection limits shall not exceed the concentrations listed in Table C to this paragraph.

**TABLE C—DETECTION LIMITS FOR MAN-MADE BETA PARTICLE AND PHOTON EMITTERS**

Radionuclide	Detection limit
Tritium	1,000 pCi/1.
Strontium-89	10 pCi/1.
Strontium-90	2 pCi/1.
Iodine-131	1 pCi/1.
Cesium-134	10 pCi/1.

Radionuclide	Detection limit
Gross beta	4 pCi/l.
Other radionuclides	1/10 of the applicable limit.

- (d) To judge compliance with the maximum contaminant levels listed in § 141.66, averages of data shall be used and shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.
- (e) The State has the authority to determine compliance or initiate enforcement action based upon analytical results or other information compiled by their sanctioned representatives and agencies.

[41 FR 28404, July 9, 1976, as amended at 45 FR 57345, Aug. 27, 1980; 62 FR 10173, Mar. 5, 1997; 65 FR 76745, Dec. 7, 2000; 67 FR 65250, Oct. 23, 2002; 69 FR 38855, June 29, 2004; 69 FR 52180, Aug. 25, 2004; 72 FR 11245, Mar. 12, 2007; 74 FR 30958, June 29, 2009]

## § 141.26 Monitoring frequency and compliance requirements for radionuclides in community water systems.

- (a) *Monitoring and compliance requirements for gross alpha particle activity, radium-226, radium-228, and uranium.*
  - (1) Community water systems (CWSs) must conduct initial monitoring to determine compliance with § 141.66(b), (c), and (e) by December 31, 2007. For the purposes of monitoring for gross alpha particle activity, radium-226, radium-228, uranium, and beta particle and photon radioactivity in drinking water, "detection limit" is defined as in § 141.25(c).
    - (i) *Applicability and sampling location for existing community water systems or sources.* All existing CWSs using ground water, surface water or systems using both ground and surface water (for the purpose of this section hereafter referred to as systems) must sample at every entry point to the distribution system that is representative of all sources being used (hereafter called a sampling point) under normal operating conditions. The system must take each sample at the same sampling point unless conditions make another sampling point more representative of each source or the State has designated a distribution system location, in accordance with paragraph (a)(2)(ii)(C) of this section.
    - (ii) *Applicability and sampling location for new community water systems or sources.* All new CWSs or CWSs that use a new source of water must begin to conduct initial monitoring for the new source within the first quarter after initiating use of the source. CWSs must conduct more frequent monitoring when ordered by the State in the event of possible contamination or when changes in the distribution system or treatment processes occur which may increase the concentration of radioactivity in finished water.
  - (2) *Initial monitoring:* Systems must conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:
    - (i) Systems without acceptable historical data, as defined below, must collect four consecutive quarterly samples at all sampling points before December 31, 2007.



- (ii) **Grandfathering of data:** States may allow historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point, for the following situations.
  - (A) To satisfy initial monitoring requirements, a community water system having only one entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.
  - (B) To satisfy initial monitoring requirements, a community water system with multiple entry points and having appropriate historical monitoring data for each entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.
  - (C) To satisfy initial monitoring requirements, a community water system with appropriate historical data for a representative point in the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003, provided that the State finds that the historical data satisfactorily demonstrate that each entry point to the distribution system is expected to be in compliance based upon the historical data and reasonable assumptions about the variability of contaminant levels between entry points. The State must make a written finding indicating how the data conforms to these requirements.
- (iii) For gross alpha particle activity, uranium, radium-226, and radium-228 monitoring, the State may waive the final two quarters of initial monitoring for a sampling point if the results of the samples from the previous two quarters are below the detection limit.
- (iv) If the average of the initial monitoring results for a sampling point is above the MCL, the system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the State.
- (3) **Reduced monitoring:** States may allow community water systems to reduce the future frequency of monitoring from once every three years to once every six or nine years at each sampling point, based on the following criteria.
  - (i) If the average of the initial monitoring results for each contaminant (*i.e.*, gross alpha particle activity, uranium, radium-226, or radium-228) is below the detection limit specified in Table B, in § 141.25(c)(1), the system must collect and analyze for that contaminant using at least one sample at that sampling point every nine years.
  - (ii) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is at or above the detection limit but at or below  $\frac{1}{2}$  the MCL, the system must collect and analyze for that contaminant using at least one sample at that sampling point every six years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is at or above the detection limit but at or below  $\frac{1}{2}$  the MCL, the system must collect and analyze for that contaminant using at least one sample at that sampling point every six years.
  - (iii) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above  $\frac{1}{2}$  the MCL but at or below the MCL, the system must collect and analyze at least one sample at that sampling point every three years. For combined radium-226

and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is above  $1/2$  the MCL but at or below the MCL, the system must collect and analyze at least one sample at that sampling point every three years.

- (iv) Systems must use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods (e.g., if a system's sampling point is on a nine year monitoring period, and the sample result is above  $1/2$  MCL, then the next monitoring period for that sampling point is three years).
- (v) If a system has a monitoring result that exceeds the MCL while on reduced monitoring, the system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the State.

(4) **Compositing:** To fulfill quarterly monitoring requirements for gross alpha particle activity, radium-226, radium-228, or uranium, a system may composite up to four consecutive quarterly samples from a single entry point if analysis is done within a year of the first sample. States will treat analytical results from the composited as the average analytical result to determine compliance with the MCLs and the future monitoring frequency. If the analytical result from the composited sample is greater than  $1/2$  MCL, the State may direct the system to take additional quarterly samples before allowing the system to sample under a reduced monitoring schedule.

(5) A gross alpha particle activity measurement may be substituted for the required radium-226 measurement provided that the measured gross alpha particle activity does not exceed 5 pCi/l. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/l. The gross alpha measurement shall have a confidence interval of 95% ( $1.65\sigma$ , where  $\sigma$  is the standard deviation of the net counting rate of the sample) for radium-226 and uranium. When a system uses a gross alpha particle activity measurement in lieu of a radium-226 and/or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 and/or uranium. If the gross alpha particle activity result is less than detection,  $1/2$  the detection limit will be used to determine compliance and the future monitoring frequency.

(b) **Monitoring and compliance requirements for beta particle and photon radioactivity.** To determine compliance with the maximum contaminant levels in § 141.66(d) for beta particle and photon radioactivity, a system must monitor at a frequency as follows:

(1) Community water systems (both surface and ground water) designated by the State as vulnerable must sample for beta particle and photon radioactivity. Systems must collect quarterly samples for beta emitters and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the State. Systems already designated by the State must continue to sample until the State reviews and either reaffirms or removes the designation.

- (i) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 50 pCi/L (screening level), the State may reduce the frequency of monitoring at that sampling point to once every 3 years. Systems must collect all samples required in paragraph (b)(1) of this section during the reduced monitoring period.

- (ii) For systems in the vicinity of a nuclear facility, the State may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the State determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with paragraph (b)(1) of this section.
- (2) Community water systems (both surface and ground water) designated by the State as utilizing waters contaminated by effluents from nuclear facilities must sample for beta particle and photon radioactivity. Systems must collect quarterly samples for beta emitters and iodine-131 and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the State. Systems already designated by the State as systems using waters contaminated by effluents from nuclear facilities must continue to sample until the State reviews and either reaffirms or removes the designation.
  - (i) Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of three monthly samples. The former is recommended.
  - (ii) For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. As ordered by the State, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water.
  - (iii) Annual monitoring for strontium-90 and tritium shall be conducted by means of the analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The latter procedure is recommended.
  - (iv) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 15 pCi/L (screening level), the State may reduce the frequency of monitoring at that sampling point to every 3 years. Systems must collect the same type of samples required in paragraph (b)(2) of this section during the reduced monitoring period.
  - (v) For systems in the vicinity of a nuclear facility, the State may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the State determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with paragraph (b)(2) of this section.
- (3) Community water systems designated by the State to monitor for beta particle and photon radioactivity can not apply to the State for a waiver from the monitoring frequencies specified in paragraph (b)(1) or (b)(2) of this section.
- (4) Community water systems may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. Systems are allowed to subtract the potassium-40 beta particle activity value from the total gross beta particle activity value to determine if the screening level is exceeded. The potassium-40 beta particle activity must be calculated by multiplying elemental potassium concentrations (in mg/L) by a factor of 0.82.

- (5) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity exceeds the appropriate screening level, an analysis of the sample must be performed to identify the major radioactive constituents present in the sample and the appropriate doses must be calculated and summed to determine compliance with § 141.66(d)(1), using the formula in § 141.66(d)(2). Doses must also be calculated and combined for measured levels of tritium and strontium to determine compliance.
- (6) Systems must monitor monthly at the sampling point(s) which exceed the maximum contaminant level in § 141.66(d) beginning the month after the exceedance occurs. Systems must continue monthly monitoring until the system has established, by a rolling average of 3 monthly samples, that the MCL is being met. Systems who establish that the MCL is being met must return to quarterly monitoring until they meet the requirements set forth in paragraph (b)(1)(i) or (b)(2)(iv) of this section.

(c) ***General monitoring and compliance requirements for radionuclides.***

- (1) The State may require more frequent monitoring than specified in paragraphs (a) and (b) of this section, or may require confirmation samples at its discretion. The results of the initial and confirmation samples will be averaged for use in compliance determinations.
- (2) Each public water systems shall monitor at the time designated by the State during each compliance period.
- (3) ***Compliance:*** Compliance with § 141.66 (b) through (e) will be determined based on the analytical result(s) obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.
  - (i) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. If the average of any sampling point is greater than the MCL, then the system is out of compliance with the MCL.
  - (ii) For systems monitoring more than once per year, if any sample result will cause the running average to exceed the MCL at any sample point, the system is out of compliance with the MCL immediately.
  - (iii) Systems must include all samples taken and analyzed under the provisions of this section in determining compliance, even if that number is greater than the minimum required.
  - (iv) If a system does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance will be based on the running average of the samples collected.
  - (v) If a sample result is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226 and/or uranium. If the gross alpha particle activity result is less than detection,  $1/2$  the detection limit will be used to calculate the annual average.
- (4) States have the discretion to delete results of obvious sampling or analytic errors.
- (5) If the MCL for radioactivity set forth in § 141.66 (b) through (e) is exceeded, the operator of a community water system must give notice to the State pursuant to § 141.31 and to the public as required by subpart Q of this part.

[65 FR 76745, Dec. 7, 2000, as amended at 69 FR 38855, June 29, 2004]

§ 141.27 Alternate analytical techniques.

- (a) With the written permission of the State, concurred in by the Administrator of the U.S. EPA, an alternate analytical technique may be employed. An alternate technique shall be accepted only if it is substantially equivalent to the prescribed test in both precision and accuracy as it relates to the determination of compliance with any MCL. The use of the alternate analytical technique shall not decrease the frequency of monitoring required by this part.

[45 FR 57345, Aug. 27, 1980]

§ 141.28 Certified laboratories.

- (a) For the purpose of determining compliance with §§ 141.21 through 141.27, 141.40, 141.74, 141.89, 141.402, 141.901, and 141.902, samples may be considered only if they have been analyzed by a laboratory certified by EPA or the State except that measurements of alkalinity, disinfectant residual, orthophosphate, pH, silica, temperature, and turbidity may be performed by any person acceptable to the State.
- (b) Nothing in this part shall be construed to preclude the State or any duly designated representative of the State from taking samples or from using the results from such samples to determine compliance by a supplier of water with the applicable requirements of this part.

[45 FR 57345, Aug. 27, 1980; 47 FR 10999, Mar. 12, 1982, as amended at 59 FR 34323, July 1, 1994; 64 FR 67465, Dec. 1, 1999; 71 FR 65651, Nov. 8, 2006; 86 FR 4282, Jan. 15, 2021; 89 FR 32744, Apr. 26, 2024]

§ 141.29 Monitoring of consecutive public water systems.

When a public water system supplies water to one or more other public water systems, the State may modify the monitoring requirements imposed by this part to the extent that the interconnection of the systems justifies treating them as a single system for monitoring purposes. Any modified monitoring shall be conducted pursuant to a schedule specified by the State and concurred in by the Administrator of the U.S. Environmental Protection Agency.

Appendix A to Subpart C of Part 141—Alternative Testing Methods Approved for Analyses Under the Safe Drinking Water Act

Only the editions stated in the following table are approved.

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR  
141.21(f)(3)

Organism	Methodology	SM 21st Edition <sup>1</sup>	SM 22nd Edition <sup>28</sup>	SM Online <sup>3</sup>	Other
Total	Total Coliform Fermentation	9221 A, B	9221 A, B	9221	

Organism	Methodology	SM 21st Edition <sup>1</sup>	SM 22nd Edition <sup>28</sup>	SM Online <sup>3</sup>	Other
Coliforms	Technique Total Coliform Membrane Filter Technique Presence-Absence (P-A) Coliform Test ONPG-MUG Test  Colitag <sup>TM</sup>  Tecta EC/TC <sup>33</sup>	9222 A, B, C 9221 D  9223	   9223 B	A,B-06   9223 B-04	     Modified Colitag <sup>TM13</sup>

**ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.21(f)(5)**

Organism	Methodology	SM 22nd Edition <sup>28</sup>	SM Online <sup>3</sup>
Fecal Coliforms	Fecal Coliform Procedure	9221 E	9221 E-06

**ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.21(f)(6)**

Organism	Methodology	SM 20th Edition <sup>6</sup>	SM 21st Edition <sup>1</sup>	SM 22nd Edition <sup>28</sup>	SM Online <sup>3</sup>	Other
<i>E.coli</i>	ONPG-MUG Test Colitag <sup>TM</sup>  Tecta EC/TC <sup>33</sup>	9223 B	9223 B	9223 B	9223 B-97, B-04	Modified Colitag <sup>TM13</sup>

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.23(k)(1)

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition <sup>28</sup>	SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Alkalinity	Titrimetric		2320 B	2320 B	2320 B		D1067-06 B, 11 B, 16 B	
Antimony	Hydride—Atomic Absorption						D 3697-07, -12, -17	
	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10		
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>						
Arsenic	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10	D 2972-08 C, -15 C	
	Hydride Atomic Absorption		3114 B	3114 B	3114 B	3114 B-09	D 2972-08 B, -15 B	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>						
Barium	Inductively Coupled Plasma		3120 B	3120 B	3120 B			
	Atomic Absorption; Direct		3111 D	3111 D	3111 D			
	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10		
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>						
Beryllium	Inductively Coupled Plasma		3120 B	3120 B	3120 B			
	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10	D 3645-08 B, -15 B	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision						

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition <sup>28</sup>	SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Cadmium	Atomic Absorption; Furnace	4.2 <sup>2</sup>	3113 B	3113 B	3113 B	3113 B-04, B-10		
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>						
Calcium	EDTA titrimetric		3500-Ca B	3500-Ca B	3500-Ca B		D 511-09, -14 A	
	Atomic Absorption; Direct Aspiration		3111 B	3111 B	3111 B		D 511-09, -14 B	
	Inductively Coupled Plasma		3120 B	3120 B	3120 B			
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>						
Chromium	Ion Chromatography						D 6919-09, -17	
	Inductively Coupled Plasma		3120 B	3120 B	3120 B			
	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10		
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>						
Copper	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10	D 1688-07, -12 C, 17 C	
	Atomic Absorption; Direct Aspiration		3111 B	3111 B	3111 B		D 1688-07, -12 A, 17 A	
	Inductively Coupled Plasma		3120 B	3120 B	3120 B			
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>						
	Colorimetry							Hach Method 8026, <sup>35</sup> Hach Method 10272. <sup>36</sup>



Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition <sup>28</sup>	SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Conductivity	Conductance		2510 B	2510 B	2510 B		D 1125-14 A	
Cyanide	Manual Distillation with MgCl <sub>2</sub> followed by:		4500-CN <sup>-</sup> C	4500-CN <sup>-</sup> C	4500-CN <sup>-</sup> C	4500-CN <sup>-</sup> C-99	D 2036-06 A	
	Spectrophotometric, Amenable		4500-CN <sup>-</sup> G	4500-CN <sup>-</sup> G	4500-CN <sup>-</sup> G		D 2036-06 B	
	Spectrophotometric Manual		4500-CN <sup>-</sup> E	4500-CN <sup>-</sup> E	4500-CN <sup>-</sup> E		D2036-06 A	
	Selective Electrode		4500-CN <sup>-</sup> F	4500-CN <sup>-</sup> F	4500-CN <sup>-</sup> F			
	Gas Chromatography/Mass Spectrometry Headspace							ME355.01. <sup>7</sup>
Fluoride	Ion Chromatography		4110 B	4110 B	4110 B		D 4327-11, -17	
	Manual Distillation; Colorimetric SPADNS		4500-F <sup>-</sup> B, D	4500-F <sup>-</sup> B, D	4500-F <sup>-</sup> B, D			
	Manual Electrode		4500-F <sup>-</sup> C	4500-F <sup>-</sup> C	4500-F <sup>-</sup> C		D 1179-04, 10 B, 16 B	
	Automated Alizarin		4500-F <sup>-</sup> E	4500-F <sup>-</sup> E	4500-F <sup>-</sup> E			
	Arsenite-Free Colorimetric SPADNS							Hach SPADNS 2 Method 10225, <sup>22</sup> Hach Method 10312. <sup>67</sup>
Lead	Atomic Absorption; Furnace		3113 B	3113 B	3113 B	3113 B-04, B-10	D 3559-08 D, 15 D	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>						
	Differential Pulse Anodic Stripping Voltametry							Method 1001, Rev. 1.1. <sup>57</sup>
Magnesium	Atomic Absorption		3111 B	3111 B	3111 B		D 511-09, -14 B	
	Inductively Coupled Plasma		3120 B	3120 B	3120 B			
	Complexation Titrimetric Methods		3500-Mg B	3500-Mg B	3500-Mg B		D 511-09, -14 A	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision						

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition <sup>28</sup>	SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Mercury	Ion Chromatography	4.2 <sup>2</sup>					D 6919-09, -17	
	Manual, Cold Vapor		3112 B	3112 B	3112 B	3112 B-09	D 3223-12, -17	
	Nickel							
Nitrate	Inductively Coupled Plasma Atomic Absorption; Direct Atomic Absorption; Furnace	200.5, Revision 4.2 <sup>2</sup>	3120 B	3120 B	3120 B	3113 B-04, B-10		
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)		3111 B	3111 B	3111 B			
	Ion Chromatography		3113 B	3113 B	3113 B			
	Automated Cadmium Reduction						D 4327-11, -17	
	Manual Cadmium Reduction		4110 B	4110 B	4110 B			
	Ion Selective Electrode		4500-NO <sub>3</sub> <sup>-</sup> F	4500-NO <sub>3</sub> <sup>-</sup> F	4500-NO <sub>3</sub> <sup>-</sup> F			
	Reduction/Colorimetric		4500-NO <sub>3</sub> <sup>-</sup> E	4500-NO <sub>3</sub> <sup>-</sup> E	4500-NO <sub>3</sub> <sup>-</sup> E			
	Colorimetric; Direct		4500-NO <sub>3</sub> <sup>-</sup> D	4500-NO <sub>3</sub> <sup>-</sup> D	4500-NO <sub>3</sub> <sup>-</sup> D			
	Capillary Ion Electrophoresis							
	Ion Chromatography							
Nitrite	Automated Cadmium Reduction		4500-NO <sub>3</sub> <sup>-</sup> F	4500-NO <sub>3</sub> <sup>-</sup> F	4500-NO <sub>3</sub> <sup>-</sup> F			
	Manual Cadmium Reduction		4500-NO <sub>3</sub> <sup>-</sup> E	4500-NO <sub>3</sub> <sup>-</sup> E	4500-NO <sub>3</sub> <sup>-</sup> E			
	Spectrophotometric		4500-NO <sub>2</sub> <sup>-</sup> B	4500-NO <sub>2</sub> <sup>-</sup> B	4500-NO <sub>2</sub> <sup>-</sup> B			

Systea Easy (1-Reagent),<sup>8</sup> NECi Nitrate-Reductase.<sup>40</sup>  
Hach TNTplus™ 835/836 Method 10206.<sup>23</sup>

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition <sup>28</sup>	SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Ortho-phosphate	Reduction/Colorimetric	150.3 <sup>48</sup>	4110 B	4110 B	4110 B	4500-P E-99	D 6508-15 D 4327-11, -17	Systea Easy (1-Reagent), <sup>8</sup> NECi Nitrate-Reductase. <sup>40</sup>
	Capillary Ion Electrophoresis							
	Ion Chromatography							
	Colorimetric, ascorbic acid, single reagent							
pH	Colorimetric, Automated, Ascorbic Acid	150.3 <sup>48</sup>	4500-P F	4500-P F	4500-P F	4500-P F-99	D 6508-15 D 1293-12, -18	Thermo Fisher Discrete Analyzer. <sup>41</sup>
	Capillary Ion Electrophoresis Electrometric							
Selenium	Hydride-Atomic Absorption	200.5, Revision 4.2 <sup>2</sup>	3114 B	3114 B	3114 B	3114 B-09	D 3859-08 A, -15 A	
	Atomic Absorption; Furnace							
Silica	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>	3113 B	3113 B	3113 B	3113 B-04, B-10	D 3859-08 B, -15 B	
	Colorimetric							
	Molybdosilicate							
	Heteropoly blue							
Sodium	Automated for Molybdate-reactive Silica	200.5, Revision 4.2 <sup>2</sup>	4500-SiO <sub>2</sub> E	4500-SiO <sub>2</sub> E	4500-SiO <sub>2</sub> E		D859-05, 10, 16	
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)							
	Inductively Coupled Plasma							
	Atomic Absorption; Direct Aspiration							
	Axially viewed inductively coupled plasma-atomic	200.5,	3120 B	3120 B	3120 B			
			3111 B	3111 B	3111 B			

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition <sup>28</sup>	SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Temperature	emission spectrometry (AVICP-AES)	Revision 4.2 <sup>2</sup>					D 6919-09, -17	
	Ion Chromatography							
	Thermometric		2550	2550	2550	2550-10		

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.24(e)(1)

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition, <sup>28</sup> SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Benzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
Carbon tetrachloride	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
Chlorobenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
1,2-Dichlorobenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
1,4-Dichlorobenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
1,2-Dichloroethane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
cis-Dichloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
trans-Dichloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
Dichloromethane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
1,2-Dichloropropane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
Ethylbenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
Styrene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
Tetrachloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
1,1,1-Trichloroethane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
Trichloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3, <sup>9</sup>					

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition, <sup>28</sup> SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Toluene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.4. <sup>29</sup> 524.3. <sup>9</sup> 524.4. <sup>29</sup>					
1,2,4-Trichlorobenzene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3. <sup>9</sup> 524.4. <sup>29</sup>					
1,1-Dichloroethylene	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3. <sup>9</sup> 524.4. <sup>29</sup>					
1,1,2-Trichloroethane	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3. <sup>9</sup> 524.4. <sup>29</sup>					
Vinyl chloride	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3. <sup>9</sup> 524.4. <sup>29</sup>					
Xylenes (total)	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3. <sup>9</sup> 524.4. <sup>29</sup>					
2,4-D	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01, B-06	D 5317-20	
2,4,5-TP (Silvex)	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01, B-06	D 5317-20	
Alachlor	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Atrazine	Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS)	536. <sup>25</sup>					
	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup> 523. <sup>26</sup>					
Benzo(a)pyrene	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Carbofuran	High-performance liquid chromatography (HPLC) with post-column derivatization and fluorescence detection		6610 B	6610 B	6610 B-04		
	Liquid Chromatography/Mass Spectrometry						ME 531. <sup>58</sup>
Chlordane	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Dalapon	Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)	557. <sup>14</sup>					
	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01,		

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition, <sup>28</sup> SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Di(2-ethylhexyl)adipate	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>			B-06		
Di(2-ethylhexyl)phthalate	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Dibromochloropropane (DBCP)	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3. <sup>9</sup>					
Dinoseb	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01, B-06		
Endrin	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Ethyl dibromide (EDB)	Purge & Trap/Gas Chromatography/Mass Spectrometry	524.3. <sup>9</sup>					
Glyphosate	High-Performance Liquid Chromatography (HPLC) with Post-Column Derivatization and Fluorescence Detection		6651 B	6651 B	6651 B-00, B-05		
Heptachlor	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Heptachlor Epoxide	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Hexachlorobenzene	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Hexachlorocyclopentadiene	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Lindane	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Methoxychlor	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Oxamyl	High-performance liquid chromatography (HPLC) with post-column derivatization and fluorescence detection		6610 B	6610 B	6610 B-04		
	Liquid Chromatography/Mass Spectrometry						ME 531. <sup>58</sup>
PCBs (as Aroclors)	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Pentachlorophenol	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01, B-06	D 5317-20	
	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					
Picloram	Gas Chromatography/Electron Capture Detection (GC/ECD)		6640 B	6640 B	6640 B-01, B-06	D 5317-20	
Simazine	Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS)	536. <sup>25</sup>					
	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS)	525.3. <sup>24</sup>					

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition, <sup>28</sup> SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	ASTM <sup>4</sup>	Other
Toxaphene Total Trihalomethanes	Solid Phase Extraction/Gas Chromatography/Mass Spectrometry (GC/MS) Purge &Trap/Gas Chromatography/Mass Spectrometry	523. <sup>26</sup> 525.3. <sup>24</sup> 524.3, <sup>9</sup> 524.4. <sup>29</sup>					



**ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR  
141.25(a)**

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition, <sup>28</sup> SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	ASTM <sup>4</sup>	SM online <sup>3</sup>
Naturally Occurring:						
Gross alpha and beta	Evaporation	900.0, Rev. 1.0 <sup>50</sup>	7110 B	7110 B		
	Liquid Scintillation			7110 D	D 7283-17	7110 D-17.
Gross alpha	Coprecipitation		7110 C	7110 C		
Radium 226	Radon emanation	903.1, Rev. 1.0 <sup>53</sup>	7500-Ra C	7500-Ra C	D 3454-05, -18, D 3454-21	
	Radiochemical	903.0, Rev. 1.0 <sup>54</sup>	7500-Ra B	7500-Ra B	D 2460-07	
	Gamma Spectrometry			7500-Ra E		7500-Ra E-07.
Radium 228	Radiochemical	904.0, Rev. 1.0 <sup>62</sup>	7500-Ra D	7500-Ra D		
	Gamma Spectrometry			7500-Ra E		7500-Ra E-07.
Uranium	Radiochemical ICP-MS		7500-U B 3125	7500-U B	D 5673-05, 10, 16	
	Alpha spectrometry		7500-U C	7500-U C	D 3972-09	
	Laser Phosphorimetry				D 5174-07	
	Alpha Liquid Scintillation Spectrometry				D 6239-09	
Man-Made:						
Radioactive	Radiochemical		7500-Cs	7500-Cs B		

Contaminant	Methodology	EPA method	SM 21st edition <sup>1</sup>	SM 22nd edition, <sup>28</sup> SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	ASTM <sup>4</sup>	SM online <sup>3</sup>
Cesium	Gamma Ray Spectrometry		B 7120	7120	D 3649-06	
Radioactive Iodine	Radiochemical		7500-I B, 7500-I C, 7500-I D	7500-I B, 7500-I C, 7500-I D	D 3649-06	
	Gamma Ray Spectrometry		7120	7120	D 4785-08, -20	
Radioactive Strontium 89, 90	Radiochemical		7500-Sr B	7500-Sr B		
Tritium	Liquid Scintillation		7500- <sup>3</sup> H B	7500- <sup>3</sup> H B	D 4107-08, -20	
Gamma Emitters	Gamma Ray Spectrometry		7120, 7500-Cs B, 7500-I B	7120, 7500-Cs B, 7500-I B	D 3649-06, D 4785-08, -20	

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.74(a)(1)

Organism	Methodology	SM 21st edition <sup>1</sup>	SM 22nd edition <sup>28</sup>	SM 23rd edition <sup>49</sup>	SM 24th edition <sup>66</sup>	SM online <sup>3</sup>	Other
Total Coliform	Total Coliform Fermentation Technique	9221 A, B, C	9221 A, B, C	9221 A, B, C	9221 A, B, C	9221 A, B, C-06	
	Total Coliform Membrane Filter Technique	9222 A, B, C		9222 A, B, C	9222 A, B, C		
	ONPG-MUG Test	9223	9223 B	9223 B	9223 B	9223 B-04	
Fecal Coliforms	Fecal Coliform Procedure	9221 E	9221 E	9221 E	9221 E	9221 E-06	
	Fecal Coliform Filter Procedure	9222 D	9222 D	9222 D	9222 D	9222 D-06	
Heterotrophic bacteria	Pour Plate Method	9215 B	9215 B	9215 B		9215 B-04	
Turbidity	Nephelometric Method	2130 B	2130 B	2130 B	2130 B		Hach Method 8195, Rev. 3.0. <sup>52</sup>
	Laser Nephelometry (on-line)						Mitchell M5271, <sup>10</sup> Mitchell M5331, Rev. 1.2, <sup>42</sup> Lovibond PTV 6000. <sup>46</sup>
	LED Nephelometry (on-line)						Mitchell M5331, <sup>11</sup> Mitchell M5331, Rev. 1.2, <sup>42</sup> Lovibond PTV 2000, <sup>45</sup> Yokogawa 820. <sup>68</sup>
	LED Nephelometry (on-line)						AMI Turbiwell, <sup>15</sup> Lovibond PTV 1000. <sup>44</sup>
	LED Nephelometry (portable)						Orion AQ4500, <sup>12</sup> Lovibond TB 3500, <sup>64</sup> Lovibond TB 5000. <sup>65</sup>
	Laser Nephelometry (portable)						Lovibond TB 6000. <sup>63</sup>
	360° Nephelometry						Hach Method 10258, Rev. 1.0, <sup>39</sup> Hach Method 10258, Rev. 2.0. <sup>51</sup>

## ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.74(a)(2)

Residual	Methodology	EPA methods	SM 21st edition <sup>1</sup>	SM 22nd edition, <sup>28</sup> SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	ASTM <sup>4</sup>	Other
Free Chlorine	Amperometric Titration	EPA 334.0. <sup>16</sup>	4500-Cl D	4500-Cl D	D 1253-08, -14	Hach Method 10260. <sup>31</sup> Hach Method 10241. <sup>34</sup>  ChloroSense, <sup>17</sup> ChloroSense, Rev. 1.1. <sup>59</sup>
	DPD Ferrous Titrimetric		4500-Cl F	4500-Cl F		
	DPD Colorimetric		4500-Cl G	4500-Cl G		
	Indophenol Colorimetric					
	Syringaldazine (FACTS)		4500-Cl H	4500-Cl H		
	On-line Chlorine Analyzer					
Total Chlorine	Amperometric Sensor	127. <sup>55</sup>			D 1253-08, -14	Hach Method 10260. <sup>31</sup>  ChloroSense, <sup>17</sup> ChloroSense, Rev. 1.1. <sup>59</sup>
	Amperometric Titration		4500-Cl D	4500-Cl D		
	Amperometric Titration (Low level measurement)		4500-Cl E	4500-Cl E		
	DPD Ferrous Titrimetric		4500-Cl F	4500-Cl F		
	DPD Colorimetric		4500-Cl G	4500-Cl G		
	Indophenol Colorimetric					
	Iodometric Electrode		4500-Cl I	4500-Cl I		
	On-line Chlorine Analyzer					
	Amperometric Sensor	EPA 334.0. <sup>16</sup>				ChloroSense, <sup>17</sup> ChloroSense, Rev. 1.1. <sup>59</sup>

Residual	Methodology	EPA methods	SM 21st edition <sup>1</sup>	SM 22nd edition, <sup>28</sup> SM 23rd edition, <sup>49</sup> SM 24th edition <sup>66</sup>	ASTM <sup>4</sup>	Other
Chlorine Dioxide	Amperometric Titration Amperometric Titration Amperometric Sensor		4500-ClO <sub>2</sub> C 4500-ClO <sub>2</sub> E	4500-ClO <sub>2</sub> C 4500-ClO <sub>2</sub> E		ChlordioX Plus, <sup>32</sup> ChlordioX Plus, Rev. 1.1. <sup>60</sup>
Ozone	Indigo Method		4500-O <sub>3</sub> B	4500-O <sub>3</sub> B		

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.131(b)(1)

Contaminant	Methodology	EPA method	ASTM <sup>4</sup>	SM online <sup>3</sup>	SM 21st edition <sup>1</sup>	SM 22nd edition, <sup>28</sup> SM 23rd edition, <sup>49</sup> SM 24th Edition <sup>66</sup>	Other
TTHM	P&T/GC/MS	524.3, <sup>9</sup> 524.4. <sup>29</sup>					
HAA5	LLE (diazomethane)/GC/ECD			6251 B-07	6251 B	6251 B	
	Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)	557. <sup>14</sup>					
	Two-Dimensional Ion Chromatography (IC) with Suppressed Conductivity Detection						Thermo Fisher 557.1. <sup>47</sup>
Bromate	Two-Dimensional Ion Chromatography (IC)	302.0 <sup>18</sup>					
	Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)	557. <sup>14</sup>					
	Chemically Suppressed Ion Chromatography		D 6581-08 A				
	Electrolytically Suppressed Ion Chromatography		D 6581-08 B				
Chlorite	Chemically Suppressed Ion Chromatography		D 6581-08 A				
	Electrolytically Suppressed Ion Chromatography		D 6581-08 B				
Chlorite—daily monitoring as prescribed in 40 CFR 141.132(b)(2)(i)(A)	Amperometric Titration				4500-ClO <sub>2</sub> E	4500-ClO <sub>2</sub> E	
	Amperometric Sensor						ChlordioX Plus, <sup>32</sup> ChlordioX Plus, Rev. 1.1. <sup>60</sup>

## ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.131(c)(1)

Residual	Methodology	SM 21 <sup>st</sup> edition <sup>1</sup>	SM 22 <sup>nd</sup> edition, <sup>28</sup> SM 23 <sup>rd</sup> edition, <sup>49</sup> SM 24 <sup>th</sup> edition <sup>66</sup>	ASTM <sup>4</sup>	Other
Free Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08, -14	
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F		
	DPD Colorimetric	4500-Cl G	4500-Cl G		Hach Method 10260. <sup>31</sup>
	Indophenol Colorimetric				Hach Method 10241. <sup>34</sup>
	Syringaldazine (FACTS)	4500-Cl H	4500-Cl H		
	Amperometric Sensor				ChloroSense, <sup>17</sup> ChloroSense, Rev. 1.1. <sup>59</sup>
	On-line Chlorine Analyzer				EPA 334.0. <sup>16</sup>
Combined Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08, -14.	
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F		
	DPD Colorimetric	4500-Cl G	4500-Cl G		Hach Method 10260. <sup>31</sup>
Total Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D	D 1253-08, -14	
	Low level Amperometric Titration	4500-Cl E	4500-Cl E		
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F		
	DPD Colorimetric	4500-Cl G	4500-Cl G		Hach Method 10260. <sup>31</sup>
	Iodometric Electrode	4500-Cl I	4500-Cl I		

Residual	Methodology	SM 21 <sup>st</sup> edition <sup>1</sup>	SM 22 <sup>nd</sup> edition, <sup>28</sup> SM 23 <sup>rd</sup> edition, <sup>49</sup> SM 24 <sup>th</sup> edition <sup>66</sup>	ASTM <sup>4</sup>	Other
Chlorine Dioxide	Amperometric Sensor				ChloroSense, <sup>17</sup> ChloroSense, Rev. 1.1. <sup>59</sup> EPA 334.0. <sup>16</sup>
	On-line Chlorine Analyzer				
	Amperometric Method II	4500-ClO <sub>2</sub> E	4500-ClO <sub>2</sub> E		
	Amperometric Sensor				ChlordioX Plus, <sup>32</sup> ChlordioX Plus, Rev. 1.1. <sup>60</sup>

ALTERNATIVE TESTING METHODS FOR DISINFECTANT RESIDUALS LISTED AT 40 CFR 141.131(c)(2), IF APPROVED BY THE STATE

Residual	Methodology	Method
Free Chlorine	Test Strips	Method D99-003 <sup>5</sup>



ALTERNATIVE TESTING METHODS FOR PARAMETERS LISTED AT 40 CFR 141.131(d)

Parameter	Methodology	SM 21 <sup>st</sup> edition <sup>1</sup>	SM 22 <sup>nd</sup> edition <sup>28</sup>	SM 23 <sup>rd</sup> edition <sup>49</sup> , SM 24 <sup>th</sup> edition <sup>66</sup>	SM online <sup>3</sup>	EPA	Other
Total Organic Carbon (TOC)	High Temperature Combustion	5310 B	5310 B	5310 B		415.3, Rev 1.2 <sup>19</sup>	
	Persulfate-Ultraviolet or Heated Persulfate Oxidation	5310 C	5310 C	5310 C		415.3, Rev 1.2 <sup>19</sup>	Hach Method 10267 <sup>38</sup> .
	Wet Oxidation	5310 D	5310 D			415.3, Rev 1.2 <sup>19</sup>	
	Ozone Oxidation						Hach Method 10261 <sup>37</sup> .
Specific Ultraviolet Absorbance (SUVA)	Calculation using DOC and UV <sub>254</sub> data					415.3, Rev 1.2 <sup>19</sup>	
Dissolved Organic Carbon (DOC)	High Temperature Combustion	5310 B	5310 B	5310 B		415.3, Rev 1.2 <sup>19</sup>	
	Persulfate-Ultraviolet or Heated Persulfate Oxidation	5310 C	5310 C	5310 C		415.3, Rev 1.2 <sup>19</sup>	
	Wet Oxidation	5310 D	5310 D			415.3, Rev 1.2 <sup>19</sup>	
Ultraviolet absorption at 254 nm (UV <sub>254</sub> )	Spectrophotometry	5910 B	5910 B	5910 B	5910 B-11	415.3, Rev 1.2 <sup>19</sup>	

**ALTERNATIVE TESTING METHODS WITH MRL  $\leq 0.0010$  MG/L FOR MONITORING  
LISTED AT 40 CFR 141.132(b)(3)(ii)(B)**

Contaminant	Methodology	EPA method
Bromate	Two-Dimensional Ion Chromatography (IC)	302.0 <sup>18</sup>
	Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)	557 <sup>14</sup>

ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.402(c)(2)

Organism	Methodology	SM 20 <sup>th</sup> edition <sup>6</sup>	SM 21 <sup>st</sup> edition <sup>1</sup>	SM 22 <sup>nd</sup> edition <sup>28</sup>	SM 23 <sup>rd</sup> edition <sup>49</sup> , SM 24 <sup>th</sup> edition <sup>66</sup>	SM online <sup>3</sup>	Other
<i>E. coli</i>	Colilert		9223 B	9223 B	9223 B	9223 B-97, B-04	
	Colisure		9223 B	9223 B	9223 B	9223 B-97, B-04	
	Colilert-18	9223 B	9223 B	9223 B	9223 B	9223 B-97, B-04	
	Readycult®						Readycult®. <sup>20</sup>
	Colitag						Modified Colitag <sup>TM13</sup> , Modified Colitag <sup>TM</sup> , Version 2.0. <sup>61</sup>
	Chromocult®						Chromocult®. <sup>21</sup>
	EC-MUG			9221 F	9221 F	9221 F-06	
	NA-MUG				9222 I		
	mColiBlue24 Test				9222 J		
	Tecta EC/TC <sup>3343</sup>						
Enterococci	RAPID'E.coli 2 <sup>56</sup>						
	Multiple-Tube Technique				9230 B	9230 B-04	
	Membrane Filter Techniques				9230 C		
Coliphage	Fluorogenic Substrate Enterococcus Test (using Enterolert)				9230 D		
	Two-Step Enrichment Presence-Absence Procedure						Fast Phage. <sup>30</sup>

### ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.704(a)

Organism	Methodology	EPA Method
<i>Cryptosporidium</i>	Filtration/Immunomagnetic Separation/Immunofluorescence Assay Microscopy	1623.1 <sup>27</sup>

### ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.704(b)

Organism	Methodology	SM 20th edition <sup>6</sup>
<i>E. coli</i>	Membrane Filtration, Two Step	9222 D/9222 G

### ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 141.852(a)(5)

Organism	Methodology category	Method	SM 20 <sup>th</sup> , 21 <sup>st</sup> editions <sup>16</sup>	SM 22 <sup>nd</sup> edition <sup>28</sup>	SM 23 <sup>rd</sup> edition <sup>49</sup> , SM 24 <sup>th</sup> edition <sup>66</sup>	SM online <sup>3</sup>
Total Coliforms	Lactose Fermentation Methods	Standard Total Coliform Fermentation Technique Presence-Absence (P-A) Coliform Test		9221 B.1, B.2	9221 B.1, B.2, B.3, B.4 9221 D.1, D.2, D.3	9221 B.1, B.2-06.
	Membrane Filtration Methods	Standard Total Coliform Membrane Filter Procedure using Endo Media Simultaneous Detection of Total Coliforms and <i>E. coli</i>			9222 B, C  9222 J	

Organism	Methodology category	Method	SM 20 <sup>th</sup> , 21 <sup>st</sup> editions <sup>16</sup>	SM 22 <sup>nd</sup> edition <sup>28</sup>	SM 23 <sup>rd</sup> edition <sup>49</sup> , SM 24 <sup>th</sup> edition <sup>66</sup>	SM online <sup>3</sup>
<i>Escherichia coli</i>	Enzyme Substrate Methods	by Dual Chromogen Membrane Filter Procedure (using mColiBlue24 medium) Simultaneous Detection of Total Coliform Bacteria and <i>Escherichia coli</i> Using RAPID <sup>®</sup> <i>E. coli</i> (REC2) in Drinking Water <sup>56</sup>				
		Colilert <sup>®</sup>		9223 B	9223 B	9223 B-04.
		Colisure <sup>®</sup>		9223 B	9223 B	9223 B-04.
		Colilert-18	9223 B	9223 B	9223 B	9223 B-04.
	<i>Escherichia coli</i> Procedure (following Lactose Fermentation Methods)	Tecta EC/TC <sup>3343</sup> Modified Colitag <sup>™</sup> , Version 2.0 <sup>61</sup>				
		EC-MUG medium		9221 F.1	9221 F.1	9221 F.1-06.
		EC broth with MUG (EC-MUG)			9222 H	
	Partitioning Methods (following Membrane Filtration Methods)					
	Simultaneous Detection of Total Coliforms and <i>E. coli</i> by Dual Chromogen Membrane Filter	NA-MUG medium mColiBlue24 medium			9222 I 9222 J	

Organism	Methodology category	Method	SM 20 <sup>th</sup> , 21 <sup>st</sup> editions <sup>16</sup>	SM 22 <sup>nd</sup> edition <sup>28</sup>	SM 23 <sup>rd</sup> edition <sup>49</sup> , SM 24 <sup>th</sup> edition <sup>66</sup>	SM online <sup>3</sup>
	Procedure Membrane Filtration Method	Simultaneous Detection of Total Coliform Bacteria and <i>Escherichia coli</i> Using RAPID <sup>®</sup> <i>E.coli</i> (REC2) in Drinking Water <sup>56</sup>				
	Enzyme Substrate Methods	Colilert <sup>®</sup>		9223 B	9223 B	9223 B-04.
		Colisure <sup>®</sup>		9223 B	9223 B	9223 B-04.
		Colilert-18	9223 B	9223 B	9223 B	9223 B-04.
		Tecta EC/TC <sup>3343</sup> Modified Colitag <sup>™</sup> ,				

Organism	Methodology category	Method	SM 20 <sup>th</sup> , 21 <sup>st</sup> editions <sup>16</sup>	SM 22 <sup>nd</sup> edition <sup>28</sup>	SM 23 <sup>rd</sup> edition <sup>49</sup> , SM 24 <sup>th</sup> edition <sup>66</sup>	SM online <sup>3</sup>
		Version 2.0 <sup>61</sup>				

## ALTERNATIVE TESTING METHODS FOR CONTAMINANTS LISTED AT 40 CFR 143.4(b)

Contaminant	Methodology	EPA method	ASTM <sup>4</sup>	SM 21 <sup>st</sup> edition <sup>1</sup>	SM 22 <sup>nd</sup> edition, <sup>28</sup> SM 23 <sup>rd</sup> edition, <sup>49</sup> SM 24 <sup>th</sup> edition <sup>66</sup>	SM online <sup>3</sup>
Aluminum	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>				
	Atomic Absorption; Direct			3111 D	3111 D	
	Atomic Absorption; Furnace			3113 B	3113 B	
	Inductively Coupled Plasma			3120 B	3120 B	
Chloride	Silver Nitrate Titration		D 512-04 B, 12 B D 4327-11, -17	4500-Cl <sup>-</sup> B	4500-Cl <sup>-</sup> B	3113 B-04, B-10.
	Ion Chromatography			4110 B	4110 B	
	Potentiometric Titration			4500-Cl <sup>-</sup> D	4500-Cl <sup>-</sup> D	
	Visual Comparison			2120 B	2120 B	
Color	Methylene Blue Active Substances (MBAS)			5540 C	5540 C	
Foaming Agents						
Iron	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)					
	Atomic Absorption; Direct			3111 B	3111 B	
	Atomic Absorption; Furnace			3113 B	3113 B	3113 B-04, B-10
	Inductively Coupled			3120 B	3120 B	



Manganese	Plasma					
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>				
	Atomic Absorption; Direct			3111 B	3111 B	
	Atomic Absorption; Furnace			3113 B	3113 B	3113 B-04, B-10.
	Inductively Coupled Plasma			3120 B	3120 B	
Odor	Threshold Odor Test			2150 B	2150 B	
Silver	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2 <sup>2</sup>				
	Atomic Absorption; Direct			3111 B	3111 B	
	Atomic Absorption; Furnace			3113 B	3113 B	3113 B-04, B-10.
	Inductively Coupled Plasma			3120 B	3120 B	
Sulfate	Ion Chromatography		D 4327-11, -17	4110 B	4110 B	
	Gravimetric with ignition of residue			4500-SO <sub>4</sub> <sup>2-</sup> C	4500-SO <sub>4</sub> <sup>2-</sup> C	4500-SO <sub>4</sub> <sup>2-</sup> C-97.
	Gravimetric with drying of residue			4500-SO <sub>4</sub> <sup>2-</sup> D	4500-SO <sub>4</sub> <sup>2-</sup> D	4500-SO <sub>4</sub> <sup>2-</sup> D-97.
	Turbidimetric method		D 516-07, 11, 16	4500-SO <sub>4</sub> <sup>2-</sup> E	4500-SO <sub>4</sub> <sup>2-</sup> E	4500-SO <sub>4</sub> <sup>2-</sup> E-97.
	Automated methylthymol blue method			4500-SO <sub>4</sub> <sup>2-</sup> F	4500-SO <sub>4</sub> <sup>2-</sup> F	4500-SO <sub>4</sub> <sup>2-</sup> F-97.
	Total Dissolved Solids			2540 C	2540 C	
Zinc	Axially viewed inductively coupled	200.5, Revision				

plasma-atomic emission spectrometry (AVICP-AES)	4.2 <sup>2</sup>			
Atomic Absorption; Direct Aspiration			3111 B	3111 B
Inductively Coupled Plasma			3120 B	3120 B

<sup>1</sup> Standard Methods for the Examination of Water and Wastewater, 21st edition (2005). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

<sup>2</sup> EPA Method 200.5, Revision 4.2. "Determination of Trace Elements in Drinking Water by Axially Viewed Inductively Coupled Plasma-Atomic Emission Spectrometry." 2003. EPA/600/R-06/115. (Available at <http://www.epa.gov/water-research/epa-drinking-water-research-methods>.)

<sup>3</sup> Standard Methods Online are available at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

<sup>4</sup> Available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or <http://astm.org>. The methods listed are the only alternative versions that may be used.

<sup>5</sup> Method D99-003, Revision 3.0. "Free Chlorine Species (HOCl<sup>-</sup> and OCl<sup>-</sup>) by Test Strip," November 21, 2003. Available from Industrial Test Systems, Inc., 1875 Langston St., Rock Hill, SC 29730.

<sup>6</sup> Standard Methods for the Examination of Water and Wastewater, 20th edition (1998). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

<sup>7</sup> Method ME355.01, Revision 1.0. "Determination of Cyanide in Drinking Water by GC/MS Headspace," May 26, 2009. Available at <https://www.nemi.gov> or from James Eaton, H & E Testing Laboratory, 221 State Street, Augusta, ME 04333. (207) 287-2727.

<sup>8</sup> Syssta Easy (1-Reagent). "Syssta Easy (1-Reagent) Nitrate Method," February 4, 2009. Available at <https://www.nemi.gov> or from Syssta Scientific, LLC., 900 Jorie Blvd., Suite 35, Oak Brook, IL 60523.

<sup>9</sup> EPA Method 524.3, Version 1.0. "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry," June 2009. EPA 815-B-09-009. Available at <https://www.nemi.gov>.

<sup>10</sup> Mitchell Method M5271, Revision 1.1. "Determination of Turbidity by Laser Nephelometry," March 5, 2009. Available at <https://www.nemi.gov> or from Leck Mitchell, Ph.D., PE, 656 Independence Valley Dr., Grand Junction, CO 81507.

<sup>11</sup> Mitchell Method M5331, Revision 1.1. "Determination of Turbidity by LED Nephelometry," March 5, 2009. Available at <https://www.nemi.gov> or from Leck Mitchell, Ph.D., PE, 656 Independence Valley Dr., Grand Junction, CO 81507.

<sup>12</sup> Orion Method AQ4500, Revision 1.0. "Determination of Turbidity by LED Nephelometry," May 8, 2009. Available at <https://www.nemi.gov> or from Thermo Scientific, 166 Cummings Center, Beverly, MA 01915, <http://www.thermo.com>.

<sup>13</sup> Modified Colitag<sup>TM</sup> Method. "Modified Colitag<sup>TM</sup> Test Method for the Simultaneous Detection of E. coli and other Total Coliforms in Water (ATP D05-0035)," August 28, 2009. Available at <https://www.nemi.gov> or from CPI International, 5580 Skylane Boulevard, Santa Rosa, CA 95403.

<sup>14</sup> EPA Method 557. "Determination of Haloacetic Acids, Bromate, and Dalapon in Drinking Water by Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)," September

2009. EPA 815-B-09-012. Available at <https://www.nemi.gov>.

<sup>15</sup> AMI Turbiwell, "Continuous Measurement of Turbidity Using a SWAN AMI Turbiwell Turbidimeter," August 2009. Available at <https://www.nemi.gov> or from Markus Bernasconi, SWAN Analytische Instrumente AG, Stubbachstrasse 13, CH-8340 Hinwil, Switzerland.

<sup>16</sup> EPA Method 334.0. "Determination of Residual Chlorine in Drinking Water Using an On-line Chlorine Analyzer," September 2009. EPA 815-B-09-013. Available at <https://www.nemi.gov>.

<sup>17</sup> ChloroSense. "Measurement of Free and Total Chlorine in Drinking Water by Palintest ChloroSense," August 2009. Available at <https://www.nemi.gov> or from Palintest Ltd, 1455 Jamike Avenue (Suite 100), Erlanger, KY 41018.

<sup>18</sup> EPA Method 302.0. "Determination of Bromate in Drinking Water using Two-Dimensional Ion Chromatography with Suppressed Conductivity Detection," September 2009. EPA 815-B-09-014. Available at <https://www.nemi.gov>.

<sup>19</sup> EPA 415.3, Revision 1.2. "Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water," September 2009. EPA/600/R-09/122. Available at <http://www.epa.gov/water-research/epa-drinking-water-research-methods>.

<sup>20</sup> ReadyCult® Method, "ReadyCult® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and Escherichia coli in Finished Waters," January, 2007. Version 1.1. Available from EMD Millipore (division of Merck KGaA, Darmstadt, Germany), 290 Concord Road, Billerica, MA 01821.

<sup>21</sup> Chromocult® Method, "Chromocult® Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and Escherichia coli in Finished Waters," November, 2000. Version 1.0. EMD Millipore (division of Merck KGaA, Darmstadt, Germany), 290 Concord Road, Billerica, MA 01821.

<sup>22</sup> Hach Company. "Hach Company SPADNS 2 (Arsenite-Free) Fluoride Method 10225-Spectrophotometric Measurement of Fluoride in Water and Wastewater," January 2011. 5600 Lindbergh Drive, P.O. Box 389, Loveland, Colorado 80539.

<sup>23</sup> Hach Company. "Hach Company TNTplus™ 835/836 Nitrate Method 10206-Spectrophotometric Measurement of Nitrate in Water and Wastewater," January 2011. 5600 Lindbergh Drive, P.O. Box 389, Loveland, Colorado 80539.

<sup>24</sup> EPA Method 525.3. "Determination of Semivolatile Organic Chemicals in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS)," February 2012. EPA/600/R-12/010. Available at <http://www.epa.gov/water-research/epa-drinking-water-research-methods>.

<sup>25</sup> EPA Method 536. "Determination of Triazine Pesticides and their Degradates in Drinking Water by Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS)," October 2007. EPA 815-B-07-002. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>26</sup> EPA Method 523. "Determination of Triazine Pesticides and their Degradates in Drinking Water by Gas Chromatography/Mass Spectrometry (GC/MS)," February 2011. EPA 815-R-11-002. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>27</sup> EPA Method 1623.1. "Cryptosporidium and Giardia in Water by Filtration/IMS/FA," 2012. EPA-816-R-12-001. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>28</sup> Standard Methods for the Examination of Water and Wastewater, 22nd edition (2012). Available

from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

<sup>29</sup> EPA Method 524.4, Version 1.0. "Measurement of Purgeable Organic Compounds in Water by Gas Chromatography/Mass Spectrometry using Nitrogen Purge Gas." May 2013. EPA 815-R-13-002. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>30</sup> Charm Sciences Inc. "Fast Phage Test Procedure. Presence/Absence for Coliphage in Ground Water with Same Day Positive Prediction". Version 009. November 2012. 659 Andover Street, Lawrence, MA 01843. Available at [www.charmsciences.com](http://www.charmsciences.com).

<sup>31</sup> Hach Company. "Hach Method 10260-Determination of Chlorinated Oxidants (Free and Total) in Water Using Disposable Planar Reagent-filled Cuvettes and Mesofluidic Channel Colorimetry," April 2013. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

<sup>32</sup> ChlordioX Plus. "Chlorine Dioxide and Chlorite in Drinking Water by Amperometry using Disposable Sensors," November 2013.

Available from Palintest Ltd, 1455 Jamike Avenue (Suite 100), Erlanger, KY 41018.

<sup>33</sup> Tecta EC/TC. "Tecta™ EC/TC Medium and Tecta™ Instrument: A Presence/Absence Method for the Simultaneous Detection of Total Coliforms and Escherichia coli (E. coli) in Drinking Water," version 1.0, May 2014. Available from Pathogen Detection Systems, Inc., 382 King Street East, Kingston, Ontario, Canada, K7K 2Y2.

<sup>34</sup> Hach Company. "Hach Method 10241-Spectrophotometric Measurement of Free Chlorine (Cl<sub>2</sub>) in Drinking Water," November 2015. Revision 1.2. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

<sup>35</sup> Hach Company. "Hach Method 8026-Spectrophotometric Measurement of Copper in Finished Drinking Water," December 2015. Revision 1.2. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

<sup>36</sup> Hach Company. "Hach Method 10272-Spectrophotometric Measurement of Copper in Finished Drinking Water," December 2015. Revision 1.2. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

<sup>37</sup> Hach Company. "Hach Method 10261-Total Organic Carbon in Finished Drinking Water by Catalyzed Ozone Hydroxyl Radical Oxidation Infrared Analysis," December 2015. Revision 1.2. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

<sup>38</sup> Hach Company. "Hach Method 10267-Spectrophotometric Measurement of Total Organic Carbon (TOC) in Finished Drinking Water," December 2015. Revision 1.2. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

<sup>39</sup> Hach Company. "Hach Method 10258-Determination of Turbidity by 360° Nephelometry," January 2016. Revision 1.0. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

<sup>40</sup> Nitrate Elimination Company Inc. (NECi). "Method for Nitrate Reductase Nitrate-Nitrogen Analysis of Drinking Water," February 2016. Superior Enzymes Inc., 334 Hecla Street, Lake Linden, Michigan 49945.

<sup>41</sup> Thermo Fisher. "Thermo Fisher Scientific Drinking Water Orthophosphate Method for Thermo Scientific Gallery Discrete Analyzer," February 2016. Revision 5. Thermo Fisher Scientific, Ratastie 2, 01620 Vantaa, Finland.

<sup>42</sup> Mitchell Method M5331, Revision 1.2. "Determination of Turbidity by LED or Laser Nephelometry," February 2016. Available from Leck Mitchell, Ph.D., PE, 656 Independence Valley Dr., Grand Junction, CO 81507.

<sup>43</sup> Tecta EC/TC. "Tecta™ EC/TC Medium and the Tecta™ Instrument: A Presence/Absence Method for the Simultaneous Detection of Total Coliforms and Escherichia coli (E. coli) in Drinking Water,"

version 2.0, March 2017. Available from Pathogen Detection Systems, Inc., 382 King Street East, Kingston, Ontario, Canada, K7K 2Y2.

<sup>44</sup> Lovibond PTV 1000. "Continuous Measurement of Drinking Water Turbidity using a Lovibond PTV 1000 White Light LED Turbidimeter," December 2016. Revision 1.0. Available from Tintometer, Inc., 6456 Parkland Drive, Sarasota, FL 34243.

<sup>45</sup> Lovibond PTV 2000. "Continuous Measurement of Drinking Water Turbidity Using a Lovibond PTV 2000 660-nm LED Turbidimeter," December 2016. Revision 1.0. Available from Tintometer, Inc., 6456 Parkland Drive, Sarasota, FL 34243.

<sup>46</sup> Lovibond PTV 6000. "Continuous Measurement of Drinking Water Turbidity Using a Lovibond PTV 6000 Laser Turbidimeter," December 2016. Revision 1.0. Available from Tintometer, Inc., 6456 Parkland Drive, Sarasota, FL 34243.

<sup>47</sup> Thermo Fisher. "Thermo Fisher method 557.1: Determination of Haloacetic Acids in Drinking Water using Two-Dimensional Ion Chromatography with Suppressed Conductivity Detection," January 2017. Version 1.0. Available from Thermo Fisher Scientific, 490 Lakeside Dr., Sunnyvale, CA 94085 (Richard.jack@thermofisher.com).

<sup>48</sup> EPA Method 150.3. "Determination of pH in Drinking Water," February 2017. EPA 815-B-17-001. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>49</sup> Standard Methods for the Examination of Water and Wastewater, 23rd edition (2017). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

<sup>50</sup> EPA Method 900.0, Rev. 1.0. "Determination of Gross Alpha and Gross Beta in Drinking Water," February 2018. EPA 815-B-18-002. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>51</sup> Hach Company. "Hach Method 10258—Determination of Turbidity by 360° Nephelometry." March 2018. Revision 2.0. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

<sup>52</sup> Hach Company. "Hach Method 8195-Determination of Turbidity by Nephelometry." March 2018. Revision 3.0. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539.

<sup>53</sup> EPA Method 903.1, Rev. 1.0. "Radium-226 in Drinking Water Radon Emanation Technique." January 2021. EPA 815-B-21-003. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>54</sup> EPA Method 903.0, Rev. 1.0. "Alpha-Emitting Radium Isotopes in Drinking Water." January 2021. EPA 815-B-21-002. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>55</sup> EPA Method 127. "Determination of Monochloramine Concentration in Drinking Water." January 2021. EPA 815-B-21-004. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>56</sup> Bio-Rad. "Simultaneous Detection of Total Coliform Bacteria and Escherichia coli using RAPID'E. coli 2 (REC2) in Drinking Water." May 2020. Bio-Rad Laboratories, 2000 Nobel Drive, Hercules, California 94547.

<sup>57</sup> Method 1001, Rev. 1.1. "Lead in Drinking Water by Differential Pulse Anodic Stripping Voltammetry." May 2020. Palintest Ltd, 400 Corporate Circle, Suite J, Golden, CO 80401.

<sup>58</sup> ME 531, Version 1.0. "Measurement of N-Methylcarbamoyloximes and N-Methylcarbamates in Drinking Water by LC-MS/MS. September 2019. Maine Health Environmental Testing Laboratory, 221 State Street, Augusta, ME 04330.

<sup>59</sup> ChloroSense, Rev. 1.1. "Free and Total Chlorine in Drinking Water by Amperometry using Disposable

Sensors.” February 2020. Palintest Ltd, 400 Corporate Circle, Suite J, Golden, CO 80401.

<sup>60</sup> ChlordioX Plus, Rev. 1.1. “Chlorine Dioxide and Chlorite in Drinking Water by Amperometry using Disposable Sensors.” February 2020. Palintest Ltd, 400 Corporate Circle, Suite J, Golden, CO 80401.

<sup>61</sup> Modified Colitag™, Version 2.0. “Modified Colitag™ Test Method for the Simultaneous Determination of Total Coliforms and E. coli in Water.” June 2020. Neogen Corporation, 620 Leshar Place, Lansing, MI 48912.

<sup>62</sup> EPA Method 904.0, Rev. 1.0. “Radium-228 in Drinking Water.” March 2022. EPA 815-B-22-003. Available at the National Service Center for Environmental Publications at <https://www.epa.gov/nscep>.

<sup>63</sup> Lovibond TB 6000. “Measurement of Drinking Water Turbidity of a Captured Sample using a Lovibond Portable Laser Turbidimeter.” May 2021. Revision 1.0. Available from Tintometer, Inc., 6456 Parkland Drive, Sarasota, FL 34243.

<sup>64</sup> Lovibond TB 3500. “Measurement of Drinking Water Turbidity of a Captured Sample using a Lovibond White Light LED Portable Turbidimeter.” May 2021. Revision 1.0. Available from Tintometer, Inc., 6456 Parkland Drive, Sarasota, FL 34243.

<sup>65</sup> Lovibond TB 5000. “Measurement of Drinking Water Turbidity of a Captured Sample using a Lovibond 660-nm LED Portable Turbidimeter.” May 2021. Revision 1.0. Available from Tintometer, Inc., 6456 Parkland Drive, Sarasota, FL 34243.

<sup>66</sup> Standard Methods for the Examination of Water and Wastewater, 24th edition (2023). Available from American Public Health Association, 800 I Street NW, Washington, DC 20001-3710.

<sup>67</sup> Hach Company. “Hach Method 10312—Spectrophotometric Measurement of Fluoride in Finished Drinking Water Aluminum-Chromeazurol S complex (AL-CAS) Using Planar Reagent-filled Cuvettes”. August 2022. Revision 1.0. 5600 Lindbergh Drive, Loveland, Colorado 80539.

<sup>68</sup> Yokogawa Electric Corporation. “Yokogawa Method 820—Measurement of Turbidity in Drinking Water by Right Angle Scattered Light Turbidity Analyzer”. November 2022. Revision 1.0. 2-9-32 Nakamachi, Musashino-shi, Tokyo, Japan 180-8750.

[74 FR 38353, Aug. 3, 2009, as amended at 74 FR 57914, Nov. 10, 2009; 74 FR 63069, Dec. 2, 2009; 75 FR 32299, June 8, 2010; 76 FR 37018, June 24, 2011; 77 FR 38527, June 28, 2012; 78 FR 32565, May 31, 2013; 78 FR 37463, June 21, 2013; 79 FR 35086, June 19, 2014; 79 FR 36428, June 27, 2014; 81 FR 46844, July 19, 2016; 82 FR 34867, July 27, 2017; 83 FR 51644, Oct. 12, 2018; 83 FR 54676, Oct. 31, 2018; 86 FR 28284, May 26, 2021; 86 FR 29526, June 2, 2021; 87 FR 50579, Aug. 17, 2022; 89 FR 5780, Jan. 30, 2024; 89 FR 7624, Feb. 5, 2024]

## Subpart D—Reporting and Recordkeeping

### § 141.31 Reporting requirements.

- (a) Except where a shorter period is specified in this part, the supplier of water shall report to the State the results of any test measurement or analysis required by this part within
  - (1) The first ten days following the month in which the result is received, or
  - (2) the first ten days following the end of the required monitoring period as stipulated by the State, whichever of these is shortest.

- (b) Except where a different reporting period is specified in this part, the supplier of water must report to the State within 48 hours the failure to comply with any national primary drinking water regulation (including failure to comply with monitoring requirements) set forth in this part.
- (c) The supplier of water is not required to report analytical results to the State in cases where a State laboratory performs the analysis and reports the results to the State office which would normally receive such notification from the supplier.
- (d)
  - (1) The public water system, within 10 days of completing the public notification requirements under subpart Q of this part for the initial public notice and any repeat notices, must submit to the primary agency a certification that it has fully complied with the public notification regulations under subpart Q. The public water system must include with this certification a representative copy of each type of notice distributed, published, posted, and made available to the persons served by the system and to the media.
  - (2) For Tier 1 notices for a lead action level exceedance, public water systems must provide a copy of the Tier 1 notice to the Administrator and the head of the primacy agency as soon as practicable, but not later than 24 hours after the public water system learns of the exceedance.
- (e) The water supply system shall submit to the State within the time stated in the request copies of any records required to be maintained under § 141.33 hereof or copies of any documents then in existence which the State or the Administrator is entitled to inspect pursuant to the authority of section 1445 of the Safe Drinking Water Act or the equivalent provisions of State law.

[40 FR 59570, Dec. 24, 1975, as amended at 45 FR 57345, Aug. 27, 1980; 65 FR 26022, May 4, 2000; 86 FR 4282, Jan. 15, 2021; 89 FR 86626, Oct. 30, 2024]

## § 141.32 [Reserved]

## § 141.33 Record maintenance.

Any owner or operator of a public water system subject to the provisions of this part shall retain on its premises or at a convenient location near its premises the following records:

- (a) Records of microbiological analyses and turbidity analyses made pursuant to this part shall be kept for not less than 5 years. Records of chemical analyses made pursuant to this part shall be kept for not less than 10 years. Actual laboratory reports may be kept, or data may be transferred to tabular summaries, provided that the following information is included:
  - (1) The date, place, and time of sampling, and the name of the person who collected the sample;
  - (2) Identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample;
  - (3) Date of analysis;
  - (4) Laboratory and person responsible for performing analysis;
  - (5) The analytical technique/method used; and
  - (6) The results of the analysis.

- (b) Records of action taken by the system to correct violations of primary drinking water regulations shall be kept for a period not less than 3 years after the last action taken with respect to the particular violation involved.
- (c) Copies of any written reports, summaries or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant, or by any local, State or Federal agency, shall be kept for a period not less than 10 years after completion of the sanitary survey involved.
- (d) Records concerning a variance or exemption granted to the system shall be kept for a period ending not less than 5 years following the expiration of such variance or exemption.
- (e) Copies of public notices issued pursuant to subpart Q of this part and certifications made to the primacy agency pursuant to § 141.31 must be kept for three years after issuance.
- (f) Copies of monitoring plans developed pursuant to this part shall be kept for the same period of time as the records of analyses taken under the plan are required to be kept under paragraph (a) of this section, except as specified elsewhere in this part.

[40 FR 59570, Dec. 24, 1975, as amended at 65 FR 26022, May 4, 2000; 71 FR 478, Jan. 4, 2006]

## § 141.34 [Reserved]

## § 141.35 Reporting for unregulated contaminant monitoring results.

- (a) **General applicability.** This section applies to any owner or operator of a public water system (PWS) required to monitor for unregulated contaminants under § 141.40(a); such owner or operator is referred to as “you.” This section specifies the information that must be reported to EPA prior to the commencement of monitoring and describes the process for reporting monitoring results to EPA. For the purposes of this section, PWS “population served” is the retail population served directly by the PWS as reported to the Federal Safe Drinking Water Information System (SDWIS/Fed). For purposes of this section, the term “finished” means water that is introduced into the distribution system of a PWS and is intended for distribution and consumption without further treatment, except the treatment necessary to maintain water quality in the distribution system (e.g., booster disinfection, addition of corrosion control chemicals). For purposes of this section, the term “State” refers to the State or Tribal government entity that has jurisdiction over your PWS even if that government does not have primary enforcement responsibility for PWSs under the Safe Drinking Water Act. For purposes of this section, the term “PWS Official” refers to the person at your PWS who is able to function as the official spokesperson for the system's Unregulated Contaminant Monitoring Regulation (UCMR) activities; and the term “PWS Technical Contact” refers to the person at your PWS who is responsible for the technical aspects of your UCMR activities, such as details concerning sampling and reporting.
- (b) **Reporting by all systems.** You must meet the reporting requirements of this paragraph if you meet the applicability criteria in § 141.40(a)(1) and (2).
  - (1) **Where to submit UCMR reporting requirement information.** Some of your reporting requirements are to be fulfilled electronically and others by mail. Information that must be submitted using EPA's electronic data reporting system must be submitted through: <https://www.epa.gov/dwucmr>. Documentation that is required to be mailed can be submitted either: To UCMR Sampling Coordinator, USEPA, Technical Support Center, 26 West Martin Luther King Drive (MS 140), Cincinnati, OH 45268; or by email at [UCMR\\_Sampling\\_Coordinator@epa.gov](mailto:UCMR_Sampling_Coordinator@epa.gov). In addition, you must notify the public of the availability of unregulated contaminant monitoring data as provided in



subpart Q (Public Notification) of this part (40 CFR 141.207). Community Water Systems that detect unregulated contaminants under this monitoring must also address such detections as part of their Consumer Confidence Reports, as provided in subpart O of this part (40 CFR 141.151).

(2) **Contacting EPA if your system does not meet applicability criteria or has a status change.** If you have received a letter from EPA or your State concerning your required monitoring and your system does not meet the applicability criteria for UCMR established in § 141.40(a)(1) or (2), or if a change occurs at your system that may affect your requirements under UCMR as defined in § 141.40(a)(3) through (5), you must mail or email a letter to EPA, as specified in paragraph (b)(1) of this section. The letter must be from your PWS Official and must include your PWS Identification (PWSID) Code along with an explanation as to why the UCMR requirements are not applicable to your PWS, or have changed for your PWS, along with the appropriate contact information. EPA will make an applicability determination based on your letter and in consultation with the State when necessary. You are subject to UCMR requirements unless and until you receive a letter from EPA agreeing that you do not meet the applicability criteria.

(c) **Reporting by large systems.** If you serve a population of more than 10,000 people, and meet the applicability criteria in § 141.40(a)(2)(i), you must meet the reporting requirements in paragraphs (c)(1) through (8) of this section.

(1) **Contact and zip code information.** You must provide contact information by December 31, 2022, and provide updates within 30 days if this information changes. The contact information must be submitted using EPA's electronic data reporting system, as specified in paragraph (b)(1) of this section, and include the name, affiliation, mailing address, phone number, and email address for your PWS Technical Contact and your PWS Official. In addition, as a one-time reporting requirement, you must report the U.S. Postal Service Zip Code(s) for all areas being served water by your PWS.

(2) **Sampling location inventory information.** You must provide your inventory information by December 31, 2022, using EPA's electronic data reporting system, as specified in paragraph (b)(1) of this section. You must submit, verify, or update data elements 1-9 (as defined in Table 1 of paragraph (e) of this section) for each sampling location, or for each approved representative sampling location (as specified in paragraph (c)(3) of this section) regarding representative sampling locations. If this information changes, you must report updates, including new sources, and sampling locations that are put in use before or during the UCMR sampling period, to EPA's electronic data reporting system within 30 days of the change.

(3) **Proposed ground water representative sampling locations.** Some systems that use ground water as a source and have multiple entry points to the distribution system (EPTDSs) may propose monitoring at representative entry point(s), rather than monitor at every EPTDS, as follows:

(i) **Qualifications.** Large PWSs that have EPA- or State-approved representative EPTDS sampling locations from a previous UCMR cycle, or as provided for under 40 CFR 141.23(a)(1), 40 CFR 141.24(f)(1), or 40 CFR 141.24(h)(1), may submit a copy of documentation from your State or EPA that approves your representative sampling plan. PWSs that do not have an approved representative EPTDS sampling plan may submit a proposal to sample at representative EPTDS(s) rather than at each individual EPTDS if: You use ground water as a source; all of your well sources have either the same treatment or no treatment; and you have multiple EPTDSs from the same source (i.e., same aquifer). You must submit a copy of the existing or proposed representative EPTDS sampling plan, as appropriate, at least six months prior to your scheduled

sample collection, as specified in paragraph (b)(1) of this section. If changes to your inventory that impact your representative plan occur before or during the UCMR sampling period, you must report updates within 30 days of the change.

(ii) **Demonstration.** If you are submitting a proposal to sample at representative EPTDS(s) rather than at each individual EPTDS, you must demonstrate that any EPTDS that you propose as representative of multiple wells is associated with a well that draws from the same aquifer as the wells it will represent. The proposed well must be representative of the highest annual volume and most consistently active wells in the representative array. If that representative well is not in use at the scheduled sampling time, you must select and sample an alternative representative well. You must submit the information defined in Table 1, paragraph (e) of this section for each proposed representative sampling location. You must also include documentation to support your proposal that the specified wells are representative of other wells. This documentation can include system-maintained well logs or construction drawings indicating that the representative well(s) is/are at a representative depth, and details of well casings and grouting; data demonstrating relative homogeneity of water quality constituents (e.g., pH, dissolved oxygen, conductivity, iron, manganese) in samples drawn from each well; and data showing that your wells are located in a limited geographic area (e.g., all wells within a 0.5 mile radius) and/or, if available, the hydrogeologic data indicating the ground water travel time between the representative well and each of the individual wells it represents (e.g., all wells within a five-year time of travel delineation). Your proposal must be sent in writing to EPA, as specified in paragraph (b)(1) of this section.

(iii) **Approval.** EPA or the State (as specified in the Partnership Agreement reached between the State and EPA) will review your proposal and coordinate any necessary changes with you. Your plan will not be final until you receive written approval from EPA, identifying the final list of EPTDSs where you will be required to monitor.

(4) **Contacting EPA if your PWS has not been notified of requirements.** If you believe you are subject to UCMR requirements, as defined in 40 CFR 141.40(a)(1) and (a)(2)(i), and you have not been contacted by either EPA or your State by April 26, 2022, you must send a letter to EPA, as specified in paragraph (b)(1) of this section. The letter must be from your PWS Official and must include an explanation as to why the UCMR requirements are applicable to your system along with the appropriate contact information. A copy of the letter must also be submitted to the State as directed by the State. EPA will make an applicability determination based on your letter, and in consultation with the State when necessary and will notify you regarding your applicability status and required sampling schedule. However, if your PWS meets the applicability criteria specified in 40 CFR 141.40(a)(2)(i), you are subject to the UCMR monitoring and reporting requirements, regardless of whether you have been contacted by the State or EPA.

(5) **Notifying EPA if your PWS cannot sample according to schedule –**

(i) **General rescheduling notification requirements.** Large systems may independently change their monitoring schedules up to December 31, 2022, using EPA's electronic data reporting system, as specified in paragraph (b)(1) of this section. After this date has passed, if your PWS cannot sample according to your assigned sampling schedule (e.g., because of budget constraints, or if a sampling location will be closed during the scheduled month of monitoring), you must mail or email a letter to EPA, as specified in paragraph (b)(1) of this section, prior to the scheduled sampling date. You must include an explanation of why the samples cannot be taken according to the assigned schedule, and you must provide the alternative schedule you are requesting.

You must not reschedule monitoring specifically to avoid sample collection during a suspected vulnerable period. You are subject to your assigned UCMR sampling schedule or the schedule that you revised on or before December 31, 2022, unless and until you receive a letter from EPA specifying a new schedule.

(ii) **Exceptions to the rescheduling notification requirements.** For ground water sampling, if the second round of sampling will be completed five to seven months after the first sampling event, as specified in Table 2 of § 141.40(a)(4)(i)(B), no notification to EPA is required. If any ground water sampling location will be non-operational for more than one month before and one month after the month in which the second sampling event is scheduled (*i.e.*, it is not possible for you to sample within the five to seven month window), you must notify EPA, as specified in paragraph (b)(1) of this section, explaining why the schedule cannot be met. You must comply with any modified schedule provided by EPA.

(6) **Reporting monitoring results.** For UCMR samples, you must report all data elements specified in Table 1 of paragraph (e) of this section, using EPA's electronic data reporting system. You also must report any changes, relative to what is currently posted, made to data elements 1 through 9 to EPA in writing, explaining the nature and purpose of the proposed change, as specified in paragraph (b)(1) of this section.

(i) **Electronic reporting system.** You are responsible for ensuring that the laboratory conducting the analysis of your unregulated contaminant monitoring samples (your laboratory) posts the analytical results to EPA's electronic reporting system. You are also responsible for reviewing, approving, and submitting those results to EPA.

(ii) **Reporting schedule.** You must require your laboratory, on your behalf, to post and approve the data in EPA's electronic data reporting system, accessible at <https://www.epa.gov/dwucmr>, for your review within 90 days from the sample collection date (sample collection must occur as specified in 40 CFR 141.40(a)(4)). You then have 30 days from when the laboratory posts and approves your data to review, approve, and submit the data to the State and EPA via the agency's electronic data reporting system. If you do not electronically approve and submit the laboratory data to EPA within 30 days of the laboratory posting approved data, the data will be considered approved by you and available for State and EPA review.

(7) **Only one set of results accepted.** If you report more than one set of valid results for the same sampling location and the same sampling event (for example, because you have had more than one laboratory analyze replicate samples collected under § 141.40(a)(5), or because you have collected multiple samples during a single monitoring event at the same sampling location), EPA will use the highest of the reported values as the official result.

(8) **No reporting of previously collected data.** You cannot report previously collected data to meet the testing and reporting requirements for the contaminants listed in § 141.40(a)(3). All analyses must be performed by laboratories approved by EPA to perform UCMR analyses using the analytical methods specified in Table 1 of § 141.40(a)(3) and using samples collected according to § 141.40(a)(4). Such requirements preclude the possibility of "grandfathering" previously collected data.

(d) **Reporting by small systems.** If you serve a population of 10,000 or fewer people, and you are notified that you have been selected for UCMR monitoring, your reporting requirements will be specified within the materials that EPA sends you, including a request for contact information, and a request for information associated with the sampling kit.

- (1) **Contact and zip code information.** EPA will send you a notice requesting contact information for key individuals at your system, including name, affiliation, mailing address, phone number and email address. These individuals include your PWS Technical Contact and your PWS Official. You are required to provide this contact information within 90 days of receiving the notice from EPA as specified in paragraph (b)(1) of this section. If this contact information changes, you also must provide updates within 30 days of the change, as specified in paragraph (b)(1) of this section. In addition, as a one-time reporting requirement, you must report the U.S. Postal Service Zip Code(s) for all areas being served water by your PWS.
- (2) **Sampling location inventory information.** You must provide your inventory information by December 31, 2022, using EPA's electronic data reporting system, as specified in paragraph (b)(1) of this section. If this information changes, you must report updates, including new sources, and sampling locations that are put in use before or during the UCMR sampling period, to EPA's electronic data reporting system within 30 days of the change, as specified in paragraph (b)(1) of this section. You must record all data elements listed in Table 1 of paragraph (e) of this section on each sample form and sample bottle, as appropriate, provided to you by the UCMR Sampling Coordinator. You must send this information as specified in the instructions of your sampling kit, which will include the due date and return address. You must report any changes made in data elements 1 through 9 by emailing an explanation of the nature and purpose of the proposed change to EPA, as specified in paragraph (b)(1) of this section.
- (e) **Data elements.** Table 1 defines the data elements that must be provided for UCMR monitoring.

**TABLE 1 TO PARAGRAPH (e)—UNREGULATED CONTAMINANT MONITORING  
REPORTING REQUIREMENTS**

<b>Data element</b>	<b>Definition</b>
1. Public Water System Identification (PWSID) Code	The code used to identify each PWS. The code begins with the standard 2-character postal State abbreviation or Region code; the remaining 7 numbers are unique to each PWS in the State. The same identification code must be used to represent the PWS identification for all current and future UCMR monitoring.
2. Public Water System Name	Unique name, assigned once by the PWS.
3. Public Water System Facility Identification Code	An identification code established by the State or, at the State's discretion, by the PWS, following the format of a 5-digit number unique within each PWS for each applicable facility (i.e., for each source of water, treatment plant, distribution system, or any other facility associated with water treatment or delivery). The same identification code must be used to represent the facility for all current and future UCMR monitoring.
4. Public Water System Facility Name	Unique name, assigned once by the PWS, for every facility ID (e.g., Treatment Plant).
5. Public Water	That code that identifies that type of facility as either:

Data element	Definition
System Facility Type	CC = Consecutive connection. SS = Sampling station. TP = Treatment plant. OT = Other.
6. Water Source Type	The type of source water that supplies a water system facility. Systems must report one of the following codes for each sampling location: SW = Surface water (to be reported for water facilities that are served entirely by a surface water source during the 12-month period). GU = Ground water under the direct influence of surface water (to be reported for water facilities that are served all or in part by ground water under the direct influence of surface water at any time during the 12-month sampling period), and are not served at all by surface water during this period. MX = Mixed water (to be reported for water facilities that are served by a mix of surface water, ground water, and/or ground water under the direct influence of surface water during the 12-month period). GW = Ground water (to be reported for water facilities that are served entirely by a ground water source during the 12-month period).
7. Sampling Point Identification Code	An identification code established by the State, or at the State's discretion, by the PWS, that uniquely identifies each sampling point. Each sampling code must be unique within each applicable facility, for each applicable sampling location (i.e., entry point to the distribution system). The same identification code must be used to represent the sampling location for all current and future UCMR monitoring.
8. Sampling Point Name	Unique sample point name, assigned once by the PWS, for every sample point ID (e.g., Entry Point).
9. Sampling Point Type Code	A code that identifies the location of the sampling point as: EP = Entry point to the distribution system.
10. Disinfectant Type	All of the disinfectants/oxidants that have been added prior to and at the entry point to the distribution system. Please select all that apply: PEMB = Permanganate. HPXB = Hydrogen peroxide. CLGA = Gaseous chlorine. CLOF = Offsite generated hypochlorite (stored as a liquid form). CLON = Onsite generated hypochlorite. CAGC = Chloramine (formed with gaseous chlorine). CAOF = Chloramine (formed with offsite hypochlorite). CAON = Chloramine (formed with onsite hypochlorite). CLDB = Chlorine dioxide. OZON = Ozone. ULVL = Ultraviolet light. OTHD = All other types of disinfectant/oxidant. NODU = No disinfectant/oxidant used.

Data element	Definition
11. Treatment Information	<p>Treatment information associated with the sample point. Please select all that apply.</p> <p>CON = Conventional (non-softening, consisting of at least coagulation/ sedimentation basins and filtration).</p> <p>SFN = Softening.</p> <p>RBF = River bank filtration.</p> <p>PSD = Pre-sedimentation.</p> <p>INF = In-line filtration.</p> <p>DFL = Direct filtration.</p> <p>SSF = Slow sand filtration.</p> <p>BIO = Biological filtration (operated with an intention of maintaining biological activity within filter).</p> <p>UTR = Unfiltered treatment for surface water source.</p> <p>GWD = Groundwater system with disinfection only.</p> <p>PAC = Application of powder activated carbon.</p> <p>GAC = Granular activated carbon adsorption (not part of filters in CON, SFN, INF, DFL, or SSF).</p> <p>AIR = Air stripping (packed towers, diffused gas contactors).</p> <p>POB = Pre-oxidation with chlorine (applied before coagulation for CON or SFN plants or before filtration for other filtration plants).</p> <p>MFL = Membrane filtration.</p> <p>IEX = Ionic exchange.</p> <p>DAF = Dissolved air floatation.</p> <p>CWL = Clear well/finished water storage without aeration.</p> <p>CWA = Clear well/finished water storage with aeration.</p> <p>ADS = Aeration in distribution system (localized treatment).</p> <p>OTH = All other types of treatment.</p> <p>NTU = No treatment used.</p> <p>DKN = Do not know.</p>
12. Sample Collection Date	The date the sample is collected, reported as 4-digit year, 2-digit month, and 2-digit day (YYYYMMDD).
13. Sample Identification Code	An alphanumeric value up to 30 characters assigned by the laboratory to uniquely identify containers, or groups of containers, containing water samples collected at the same sampling location for the same sampling date.
14. Contaminant	The unregulated contaminant for which the sample is being analyzed.
15. Analytical Method Code	The identification code of the analytical method used.
16. Extraction Batch Identification Code	Laboratory assigned extraction batch ID. Must be unique for each extraction batch within the laboratory for each method. For CCC samples report the Analysis Batch Identification Code as the value for this field. For methods without an extraction batch, leave this field null.

Data element	Definition
17. Extraction Date	Date for the start of the extraction batch (YYYYMMDD). For methods without an extraction batch, leave this field null.
18. Analysis Batch Identification Code	Laboratory assigned analysis batch ID. Must be unique for each analysis batch within the laboratory for each method.
19. Analysis Date	Date for the start of the analysis batch (YYYYMMDD).
20. Sample Analysis Type	<p>The type of sample collected and/or prepared, as well as the fortification level. Permitted values include:</p> <p>CCCL = MRL level continuing calibration check; a calibration standard containing the contaminant, the internal standard, and surrogate analyzed to verify the existing calibration for those contaminants.</p> <p>CCCM = Medium level continuing calibration check; a calibration standard containing the contaminant, the internal standard, and surrogate analyzed to verify the existing calibration for those contaminants.</p> <p>CCCH = High level continuing calibration check; a calibration standard containing the contaminant, the internal standard, and surrogate analyzed to verify the existing calibration for those contaminants.</p> <p>FS = Field sample; sample collected and submitted for analysis under this final rule.</p> <p>LFB = Laboratory fortified blank; an aliquot of reagent water fortified with known quantities of the contaminants and all preservation compounds.</p> <p>LRB = Laboratory reagent blank; an aliquot of reagent water treated exactly as a field sample, including the addition of preservatives, internal standards, and surrogates to determine if interferences are present in the laboratory, reagents, or other equipment.</p> <p>LFSM = Laboratory fortified sample matrix; a UCMR field sample with a known amount of the contaminant of interest and all preservation compounds added.</p> <p>LFSMD = Laboratory fortified sample matrix duplicate; duplicate of the laboratory fortified sample matrix.</p> <p>QCS = Quality control sample; a sample prepared with a source external to the one used for initial calibration and CCC. The QCS is used to check calibration standard integrity.</p> <p>FRB = Field reagent blank; an aliquot of reagent water treated as a sample including exposure to sampling conditions to determine if interferences or contamination are present from sample collection through analysis.</p>
21. Analytical Result—Sign	<p>A value indicating whether the sample analysis result was:</p> <p>(&lt;) "less than" means the contaminant was not detected, or was detected at a level below the Minimum Reporting Level.</p> <p>(=) "equal to" means the contaminant was detected at the level reported in "Analytical Result— Measured Value."</p>
22. Analytical Result—Measured	The actual numeric value of the analytical results for: Field samples; laboratory fortified matrix samples; laboratory fortified sample matrix duplicates; and

Data element	Definition
Value	concentration fortified.
23. Additional Value	Represents the true value or the fortified concentration for spiked samples for QC Sample Analysis Types (CCCL, CCCM, CCCH, QCS, LFB, LFSM, and LFSMD).
24. Laboratory Identification Code	The code, assigned by EPA, used to identify each laboratory. The code begins with the standard two-character State postal abbreviation; the remaining five numbers are unique to each laboratory in the State.
25. Sample Event Code	<p>A code assigned by the PWS for each sample event. This will associate samples with the PWS monitoring plan to allow EPA to track compliance and completeness. Systems must assign the following codes:</p> <p>SE1, SE2, SE3, and SE4—Represent samples collected to meet UCMR Assessment Monitoring requirements; where “SE1” and “SE2” represent the first and second sampling period for all water types; and “SE3” and “SE4” represent the third and fourth sampling period for SW, GU, and MX sources only.</p>
26. Historical Information for Contaminant Detections and Treatment	<p>A yes or no answer provided by the PWS for each entry point to the distribution system.</p> <p>Question: Have you tested for the contaminant in your drinking water in the past?</p> <p>YES = If yes, did you modify your treatment and if so, what types of treatment did you implement? Select all that apply.</p> <p>PAC = Application of powder activated carbon.</p> <p>GAC = Granular activated carbon adsorption (not part of filters in CON, SFN, INF, DFL, or SSF).</p> <p>IEX = Ionic exchange.</p> <p>NRO = Nanofiltration and reverse osmosis.</p> <p>OZN = Ozone.</p> <p>BAC = Biologically active carbon.</p> <p>MFL = Membrane filtration.</p> <p>UVL = Ultraviolet light.</p> <p>OTH = Other.</p> <p>NMT = Not modified after testing.</p> <p>NO = Have never tested for the contaminant.</p> <p>DK = Do not know.</p>
27. Potential PFAS Sources	<p>A yes or no answer provided by the PWS for each entry point to the distribution system.</p> <p>Question: Are you aware of any potential current and/or historical sources of PFAS that may have impacted the drinking water sources at your water system?</p> <p>YES = If yes, select all that apply:</p> <p>MB = Military base.</p> <p>FT = Firefighting training school.</p> <p>AO = Airport operations.</p>



Data element	Definition
	CW = Car wash or industrial launderers.
	PS = Public safety activities (e.g., fire and rescue services).
	WM = Waste management.
	HW = Hazardous waste collection, treatment, and disposal.
	UW = Underground injection well.
	SC = Solid waste collection, combustors, incinerators.
	MF = Manufacturing.
	FP = Food packaging.
	TA = Textile and apparel (e.g., stain- and water-resistant, fiber/thread, carpet, house furnishings, leather).
	PP = Paper.
	CC = Chemical.
	PR = Plastics and rubber products.
	MM = Machinery.
	CE = Computer and electronic products.
	FM = Fabricated metal products (e.g., nonstick cookware).
	PC = Petroleum and coal products.
	FF = Furniture.
	OG = Oil and gas production.
	UT = Utilities (e.g., sewage treatment facilities).
	CT = Construction (e.g., wood floor finishing, electrostatic painting).
	OT = Other.
	NO = Not aware of any potential current and/or historical sources.
	DK = Do not know.

[72 FR 389, Jan. 4, 2007, as amended at 77 FR 26096, May 2, 2012; 81 FR 92684, Dec. 20, 2016; 86 FR 73151, Dec. 27, 2021; 87 FR 3679, Jan. 25, 2022]

## Subpart E—Special Regulations, Including Monitoring

### § 141.40 Monitoring requirements for unregulated contaminants.

- (a) **General applicability.** This section specifies the monitoring and quality control requirements that must be followed if you own or operate a public water system (PWS) that is subject to the Unregulated Contaminant Monitoring Regulation (UCMR), as specified in paragraphs (a)(1) and (2) of this section. In addition, this section specifies the UCMR requirements for State and Tribal participation. For the purposes of this section, PWS “population served,” “State,” “PWS Official,” “PWS Technical Contact,” and “finished water” apply as defined in § 141.35(a). The determination of whether a PWS is required to monitor under this rule is based on the type of system (e.g., community water system, non-transient non-community water system, etc.), and its retail population, as indicated by SDWIS/Fed on February 1, 2021 or subsequent corrections from the State.

- (1) **Applicability to transient non-community systems.** If you own or operate a transient non-community water system, you are not subject to monitoring requirements in this section.
- (2) **Applicability to community water systems and non-transient non-community water systems –**
  - (i) **Large systems.** If you own or operate a retail PWS (other than a transient non-community system) that serves more than 10,000 people, you must monitor according to the specifications in this paragraph (a)(2)(i). If you believe that your applicability status is different than EPA has specified in the notification letter that you received, or if you are subject to UCMR requirements and you have not been notified by either EPA or your State, you must report to EPA, as specified in § 141.35(b)(2) or (c)(4).
    - (A) **Assessment monitoring.** You must monitor for the contaminants on List 1, per Table 1, UCMR Contaminant List, in paragraph (a)(3) of this section. If you serve a retail population of more than 10,000 people, you are required to perform this monitoring regardless of whether you have been notified by the State or EPA.
    - (B) **Screening Survey.** You must monitor for the unregulated contaminants on List 2 (Screening Survey) of Table 1, as specified in paragraph (a)(3) of this section, if your system serves 10,001 to 100,000 people and you are notified by EPA or your State that you are part of the State Monitoring Plan for Screening Survey testing. If your system serves more than 100,000 people, you are required to conduct this Screening Survey testing regardless of whether you have been notified by the State or EPA.
    - (C) **Pre-Screen Testing.** You must monitor for the unregulated contaminants on List 3 of Table 1, in paragraph (a)(3) of this section, if notified by your State or EPA that you are part of the Pre-Screen Testing.
  - (ii) **Small systems.** EPA will provide sample containers, provide pre-paid air bills for shipping the sampling materials, conduct the laboratory analysis, and report and review monitoring results for all small systems selected to conduct monitoring under paragraphs (a)(2)(ii)(A) through (C) of this section. If you own or operate a PWS (other than a transient non-community water system) that serves a retail population of 10,000 or fewer people and you are notified of monitoring requirements by the State or EPA, you must monitor as follows:
    - (A) **Assessment Monitoring.** You must monitor for the contaminants on List 1 per table 1 to paragraph (a)(3) if you are notified by your State or EPA that you are part of the State Monitoring Plan for Assessment Monitoring.
    - (B) **Screening Survey.** You must monitor for the unregulated contaminants on List 2 of Table 1, in paragraph (a)(3) of this section, if notified by your State or EPA that you are part of the State Monitoring Plan for the Screening Survey.
    - (C) **Pre-screen testing.** You must monitor for the contaminants on List 3 of Table 1, in paragraph (a)(3) of this section if you are notified by your State or EPA that you are part of the State Monitoring Plan for Pre-Screen Testing.

(3) **Analytes to be monitored.** Lists 1, 2, and 3 contaminants are provided in table 1 to paragraph (a)(3):

**TABLE 1 TO PARAGRAPH (a)(3)—UCMR CONTAMINANT LIST**

1—Contaminant	2—CASRN	3—Analytical methods <sup>a</sup>	4—Minimum reporting level <sup>b</sup>	5—Sampling location <sup>c</sup>	6—Period during which sample collection to be completed
LIST 1: ASSESSMENT MONITORING					
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)					
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	763051-92-9	EPA 533	0.005 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	EPA 533	0.005 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
1H, 1H, 2H, 2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	EPA 533	0.003 µg/L	EPTDS	1/1/ 2023-12/

Column headings are:

1—Contaminant: The name of the contaminant to be analyzed.

2—CASRN (Chemical Abstracts Service Registry Number) or Identification Number: A unique number identifying the chemical contaminants.

3—Analytical Methods: Method numbers identifying the methods that must be used to test the contaminants.

4—Minimum Reporting Level (MRL): The value and unit of measure at or above which the concentration of the contaminant must be measured using the approved analytical methods. If EPA determines, after the first six months of monitoring that the specified MRLs result in excessive resampling, EPA will establish alternate MRLs and will notify affected PWSs and laboratories of the new MRLs. N/A is defined as non-applicable.

5—Sampling Location: The locations within a PWS at which samples must be collected.

6—Period During Which Sample Collection to be Completed: The time period during which the sampling and testing will occur for the indicated contaminant.

<sup>a</sup> The analytical procedures shall be performed in accordance with the documents associated with each method, see paragraph (c) of this section.

<sup>b</sup> The MRL is the minimum concentration of each analyte that must be reported to EPA.

<sup>c</sup> Sampling must occur at your PWS's entry points to the distribution system (EPTDSs), after treatment is applied, that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. The representative EPTDS must be a location within the purchaser's water system. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to the use of representative GW EPTDSs.

1—Contaminant	2—CASRN	3—Analytical methods <sup>a</sup>	4—Minimum reporting level <sup>b</sup>	5—Sampling location <sup>c</sup>	6—Period during which sample collection to be completed
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	EPA 533	0.005 µg/L	EPTDS	31/2025 1/1/ 2023-12/ 31/2025
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	EPA 533	0.003 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	EPA 533	0.002 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	13252-13-6	EPA 533	0.005 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	EPA 533	0.02 µg/L	EPTDS	1/1/ 2023-12/

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<sup>c</sup> Sampling must occur at your PWS's entry points to the distribution system (EPTDSs), after treatment is applied, that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. The representative EPTDS must be a location within the purchaser's water system. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to the use of representative GW EPTDSs.

1—Contaminant	2—CASRN	3—Analytical methods <sup>a</sup>	4—Minimum reporting level <sup>b</sup>	5—Sampling location <sup>c</sup>	6—Period during which sample collection to be completed
perfluoro (2-ethoxyethane) sulfonic acid (PFEEESA)	113507-82-7	EPA 533	0.003 µg/L	EPTDS	31/2025 1/1/ 2023-12/ 31/2025
perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	EPA 533	0.004 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	EPA 533	0.003 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluorobutanesulfonic acid (PFBS)	375-73-5	EPA 533	0.003 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluorobutanoic acid (PFBA)	375-22-4	EPA 533	0.005 µg/L	EPTDS	1/1/ 2023-12/

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<sup>c</sup> Sampling must occur at your PWS's entry points to the distribution system (EPTDSs), after treatment is applied, that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. The representative EPTDS must be a location within the purchaser's water system. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to the use of representative GW EPTDSs.

1—Contaminant	2—CASRN	3—Analytical methods <sup>a</sup>	4—Minimum reporting level <sup>b</sup>	5—Sampling location <sup>c</sup>	6—Period during which sample collection to be completed
perfluorodecanoic acid (PFDA)	335-76-2	EPA 533	0.003 µg/L	EPTDS	31/2025 1/1/ 2023-12/ 31/2025
perfluorododecanoic acid (PFDoA)	307-55-1	EPA 533	0.003 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluoroheptanesulfonic acid (PFHpS)	375-92-8	EPA 533	0.003 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluoroheptanoic acid (PFHpA)	375-85-9	EPA 533	0.003 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluorohexanesulfonic acid (PFHxS)	355-46-4	EPA 533	0.003 µg/L	EPTDS	1/1/ 2023-12/

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3—Analytical Methods: Method numbers identifying the methods that must be used to test the contaminants.

4—Minimum Reporting Level (MRL): The value and unit of measure at or above which the concentration of the contaminant must be measured using the approved analytical methods. If EPA determines, after the first six months of monitoring that the specified MRLs result in excessive resampling, EPA will establish alternate MRLs and will notify affected PWSs and laboratories of the new MRLs. N/A is defined as non-applicable.

5—Sampling Location: The locations within a PWS at which samples must be collected.

6—Period During Which Sample Collection to be Completed: The time period during which the sampling and testing will occur for the indicated contaminant.

<sup>a</sup> The analytical procedures shall be performed in accordance with the documents associated with each method, see paragraph (c) of this section.

<sup>b</sup> The MRL is the minimum concentration of each analyte that must be reported to EPA.

<sup>c</sup> Sampling must occur at your PWS's entry points to the distribution system (EPTDSs), after treatment is applied, that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. The representative EPTDS must be a location within the purchaser's water system. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to the use of representative GW EPTDSs.

1—Contaminant	2—CASRN	3—Analytical methods <sup>a</sup>	4—Minimum reporting level <sup>b</sup>	5—Sampling location <sup>c</sup>	6—Period during which sample collection to be completed
perfluorohexanoic acid (PFHxA)	307-24-4	EPA 533	0.003 µg/L	EPTDS	31/2025 1/1/ 2023-12/ 31/2025
perfluorononanoic acid (PFNA)	375-95-1	EPA 533	0.004 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluorooctanesulfonic acid (PFOS)	1763-23-1	EPA 533	0.004 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluorooctanoic acid (PFOA)	335-67-1	EPA 533	0.004 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluoropentanesulfonic acid (PFPeS)	2706-91-4	EPA 533	0.004 µg/L	EPTDS	1/1/ 2023-12/

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3—Analytical Methods: Method numbers identifying the methods that must be used to test the contaminants.

4—Minimum Reporting Level (MRL): The value and unit of measure at or above which the concentration of the contaminant must be measured using the approved analytical methods. If EPA determines, after the first six months of monitoring that the specified MRLs result in excessive resampling, EPA will establish alternate MRLs and will notify affected PWSs and laboratories of the new MRLs. N/A is defined as non-applicable.

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<sup>a</sup> The analytical procedures shall be performed in accordance with the documents associated with each method, see paragraph (c) of this section.

<sup>b</sup> The MRL is the minimum concentration of each analyte that must be reported to EPA.

<sup>c</sup> Sampling must occur at your PWS's entry points to the distribution system (EPTDSs), after treatment is applied, that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. The representative EPTDS must be a location within the purchaser's water system. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to the use of representative GW EPTDSs.

1—Contaminant	2—CASRN	3—Analytical methods <sup>a</sup>	4—Minimum reporting level <sup>b</sup>	5—Sampling location <sup>c</sup>	6—Period during which sample collection to be completed
perfluoropentanoic acid (PFPeA)	2706-90-3	EPA 533	0.003 µg/L	EPTDS	31/2025 1/1/ 2023-12/ 31/2025
perfluoroundecanoic acid (PFUnA)	2058-94-8	EPA 533	0.002 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
n-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2991-50-6	EPA 537.1	0.005 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
n-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2355-31-9	EPA 537.1	0.006 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
perfluorotetradecanoic acid (PFTA)	376-06-7	EPA 537.1	0.008 µg/L	EPTDS	1/1/ 2023-12/

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3—Analytical Methods: Method numbers identifying the methods that must be used to test the contaminants.

4—Minimum Reporting Level (MRL): The value and unit of measure at or above which the concentration of the contaminant must be measured using the approved analytical methods. If EPA determines, after the first six months of monitoring that the specified MRLs result in excessive resampling, EPA will establish alternate MRLs and will notify affected PWSs and laboratories of the new MRLs. N/A is defined as non-applicable.

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6—Period During Which Sample Collection to be Completed: The time period during which the sampling and testing will occur for the indicated contaminant.

<sup>a</sup> The analytical procedures shall be performed in accordance with the documents associated with each method, see paragraph (c) of this section.

<sup>b</sup> The MRL is the minimum concentration of each analyte that must be reported to EPA.

<sup>c</sup> Sampling must occur at your PWS's entry points to the distribution system (EPTDSs), after treatment is applied, that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. The representative EPTDS must be a location within the purchaser's water system. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to the use of representative GW EPTDSs.



1—Contaminant	2—CASRN	3—Analytical methods <sup>a</sup>	4—Minimum reporting level <sup>b</sup>	5—Sampling location <sup>c</sup>	6—Period during which sample collection to be completed
perfluorotridecanoic acid (PFTTrDA)	72629-94-8	EPA 537.1	0.007 µg/L	EPTDS	31/2025 1/1/ 2023-12/ 31/2025
METAL/PHARMACEUTICAL					
Lithium	7439-93-2	EPA 200.7, SM 3120 B, ASTM D1976-20	9 µg/L	EPTDS	1/1/ 2023-12/ 31/2025
LIST 2: SCREENING SURVEY					
Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
LIST 3: PRE-SCREEN TESTING					

Column headings are:

1—Contaminant: The name of the contaminant to be analyzed.

2—CASRN (Chemical Abstracts Service Registry Number) or Identification Number: A unique number identifying the chemical contaminants.

3—Analytical Methods: Method numbers identifying the methods that must be used to test the contaminants.

4—Minimum Reporting Level (MRL): The value and unit of measure at or above which the concentration of the contaminant must be measured using the approved analytical methods. If EPA determines, after the first six months of monitoring that the specified MRLs result in excessive resampling, EPA will establish alternate MRLs and will notify affected PWSs and laboratories of the new MRLs. N/A is defined as non-applicable.

5—Sampling Location: The locations within a PWS at which samples must be collected.

6—Period During Which Sample Collection to be Completed: The time period during which the sampling and testing will occur for the indicated contaminant.

<sup>a</sup> The analytical procedures shall be performed in accordance with the documents associated with each method, see paragraph (c) of this section.

<sup>b</sup> The MRL is the minimum concentration of each analyte that must be reported to EPA.

<sup>c</sup> Sampling must occur at your PWS's entry points to the distribution system (EPTDSs), after treatment is applied, that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. The representative EPTDS must be a location within the purchaser's water system. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to the use of representative GW EPTDSs.

1—Contaminant	2—CASRN	3—Analytical methods <sup>a</sup>	4—Minimum reporting level <sup>b</sup>	5—Sampling location <sup>c</sup>	6—Period during which sample collection to be completed
Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

Column headings are:

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5—Sampling Location: The locations within a PWS at which samples must be collected.

6—Period During Which Sample Collection to be Completed: The time period during which the sampling and testing will occur for the indicated contaminant.

<sup>a</sup> The analytical procedures shall be performed in accordance with the documents associated with each method, see paragraph (c) of this section.

<sup>b</sup> The MRL is the minimum concentration of each analyte that must be reported to EPA.

<sup>c</sup> Sampling must occur at your PWS's entry points to the distribution system (EPTDSs), after treatment is applied, that represent each non-emergency water source in routine use over the 12-month period of monitoring. Systems that purchase water with multiple connections from the same wholesaler may select one representative connection from that wholesaler. The representative EPTDS must be a location within the purchaser's water system. This EPTDS sampling location must be representative of the highest annual volume connections. If the connection selected as the representative EPTDS is not available for sampling, an alternate highest volume representative connection must be sampled. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to the use of representative GW EPTDSs.

#### (4) Sampling requirements —

(i) **Large systems.** If you serve more than 10,000 people and meet the UCMR applicability criteria specified in paragraph (a)(2)(i) of this section, you must comply with the requirements specified in paragraphs (a)(4)(i)(A) through (I) of this section. Your samples must be collected according to the schedule that you are assigned by EPA or your State, or the schedule that you revised using EPA's electronic data reporting system on or before December 31, 2022. Your schedule must follow both the timing and frequency of monitoring specified in Tables 1 and 2 of this section.

(A) **Sample collection period.** You must collect the samples in one continuous 12-month period for List 1 Assessment Monitoring, and, if applicable, for List 2 Screening Survey, or List 3 Pre-Screen Testing, during the timeframe indicated in column 6 of table 1 to

paragraph (a)(3) of this section. EPA or your State will specify the month(s) and year(s) in which your monitoring must occur. As specified in 40 CFR 141.35(c)(5), you must contact EPA if you believe you cannot collect samples according to your schedule.

- (B) **Frequency.** You must collect the samples within the timeframe and according to the frequency specified by contaminant type and water source type for each sampling location, as specified in table 2 to this paragraph (a)(4)(i)(B). For the second or subsequent round of sampling, if a sample location is non-operational for more than one month before and one month after the scheduled sampling month (i.e., it is not possible for you to sample within the window specified in table 2), you must notify EPA as specified in 40 CFR 141.35(c)(5) to reschedule your sampling.

**TABLE 2 TO PARAGRAPH (a)(4)(i)(B)—MONITORING FREQUENCY BY CONTAMINANT AND WATER SOURCE TYPES**

Contaminant type	Water source type	Timeframe	Frequency <sup>1</sup>
List 1 Contaminants	Surface water, Mixed, or GWUDI	12 months	You must monitor for four consecutive quarters. Sample events must occur three months apart. (Example: If first monitoring is in January, the second monitoring must occur any time in April, the third any time in July, and the fourth any time in October).
	Ground water	12 months	You must monitor twice in a consecutive 12-month period. Sample events must occur 5-7 months apart. (Example: If the first monitoring event is in April, the second monitoring event must occur any time in September, October, or November.)

<sup>1</sup> Systems must assign a sample event code for each contaminant listed in Table 1. Sample event codes must be assigned by the PWS for each sample event. For more information on sample event codes see 40 CFR 141.35(e) Table 1.

- (C) **Location.** You must collect samples for each List 1 Assessment Monitoring contaminant, and, if applicable, for each List 2 Screening Survey, or List 3 Pre-Screen Testing contaminant, as specified in table 1 to paragraph (a)(3) of this section. Samples must be collected at each sample point that is specified in column 5 and footnote c of table 1 to paragraph (a)(3) of this section. If you are a GW system with multiple EPTDSs, and you request and receive approval from EPA or the State for sampling at representative EPTDS(s), as specified in 40 CFR 141.35(c)(3), you must collect your samples from the approved representative sampling location(s).

- (D) **Sampling instructions.** For each List 1 Assessment Monitoring contaminant, and, if applicable, for each List 2 Screening Survey, or List 3 Pre-Screen Testing contaminant, you must follow the sampling procedure for the method specified in column 3 of Table 1, in paragraph (a)(3) of this section. In addition, you must not composite (that is, combine, mix, or blend) the samples; you must collect and preserve each sample separately.
- (E) **Sample collection and shipping time.** If you must ship the samples for analysis, you must collect the samples early enough in the day to allow adequate time to send the samples for overnight delivery to the laboratory. You should not collect samples on Friday, Saturday, or Sunday because sampling on these days may not allow samples to be shipped and received at the laboratory at the required temperature, unless you have made special arrangements with your laboratory to receive the samples.
- (F) **Analytical methods.** For each contaminant, you must use the respective analytical methods for List 1, and, if applicable, for List 2, or List 3 that are specified in column 3 of Table 1, in paragraph (a)(3) of this section; report values at or above the minimum reporting levels for List 1, and, if applicable, for List 2 Screening Survey, or List 3 Pre-Screen Testing, that are specified in column 4 of Table 1, in paragraph (a)(3) of this section; and conduct the quality control procedures specified in paragraph (a)(5) of this section.
- (G) **Laboratory errors or sampling deviations.** If the laboratory data do not meet the required QC criteria, as specified in paragraph (a)(5) of this section, or you do not follow the required sampling procedures, as specified in paragraphs (a)(4) of this section, you must resample within 30 days of being informed or becoming aware of these facts. This resampling is not for the purpose of confirming previous results, but to correct the sampling or laboratory error. All systems must report the results obtained from the first sampling for each sampling period, except for cases of sampling or laboratory errors. For the purposes of this rule, no samples are to be recollected for the purposes of confirming the results observed in a previous sampling.
- (H) **Analysis.** For the List 1 contaminants, and, if applicable, List 2 Screening Survey, or List 3 Pre-Screen Testing contaminants, identified in Table 1, paragraph (a)(3) of this section, you must arrange for testing by a laboratory that has been approved by EPA according to requirements in paragraph (a)(5)(ii) of this section.
- (I) **Review and reporting of results.** After you have received the laboratory results, you must review, approve, and submit the system information, and sample collection data and test results. You must report the results as provided in § 141.35(c)(6).
- (ii) **Small systems.** If you serve a population of 10,000 or fewer people and are notified that you are part of the State Monitoring Plan, you must comply with the requirements specified in paragraphs (a)(4)(ii)(A) through (H) of this section. If EPA or the State informs you that they will be collecting your UCMR samples, you must assist them in identifying the appropriate sampling locations and in collecting the samples.
  - (A) **Sample collection and frequency.** You must collect samples at the times specified for you by the State or EPA. Your schedule must follow both the timing of monitoring specified in table 1 to paragraph (a)(3) of this section, List 1, and, if applicable, List 2, or List 3, and the frequency of monitoring in table 2 to paragraph (a)(4)(i)(B) of this section.
  - (B) **Location.** You must collect samples at the locations specified for you by the State or EPA.

- (C) **Sample kits.** You must store and maintain the sample collection kits sent to you by the UCMR Sampling Coordinator in accordance with the kit's instructions. The sample kit will include all necessary containers, packing materials and cold packs, instructions for collecting the sample and sample treatment (such as dechlorination or preservation), report forms for each sample, contact name and telephone number for the laboratory, and a prepaid return shipping docket and return address label. If any of the materials listed in the kit's instructions are not included in the kit or arrive damaged, you must notify the UCMR Sampling Coordinator who sent you the sample collection kits.
  - (D) **Sampling instructions.** You must comply with the instructions sent to you by the State or EPA concerning the use of containers, collection (how to fill the sample bottle), dechlorination and/or preservation, and sealing and preparation of sample and shipping containers for shipment. You must not composite (that is, combine, mix, or blend) the samples. You also must collect, preserve, and test each sample separately. You must also comply with the instructions sent to you by the UCMR Sampling Coordinator concerning the handling of sample containers for specific contaminants.
  - (E) **Sampling deviations.** If you do not collect a sample according to the instructions provided to you for a listed contaminant, you must report the deviation within 7 days of the scheduled monitoring on the sample reporting form, as specified in § 141.35(d)(2). You must resample following instructions that you will be sent from the UCMR Sampling Coordinator or State. A copy of the form must be sent to the laboratory with the recollected samples, and to the UCMR Sampling Coordinator.
  - (F) [Reserved]
  - (G) **Sampling forms.** You must completely fill out each of the sampling forms and bottles sent to you by the UCMR Sampling Coordinator, including data elements listed in § 141.35(e) for each sample, as specified in § 141.35(d)(2). You must sign and date the sampling forms.
  - (H) **Sample collection and shipping.** You must collect the samples early enough in the day to allow adequate time to send the samples for overnight delivery to the laboratory. You should not collect samples on Friday, Saturday, or Sunday because sampling on these days may not allow samples to be shipped and received at the laboratory at the required temperature unless you have made special arrangements with EPA for the laboratory to receive the samples. Once you have collected the samples and completely filled in the sampling forms, you must send the samples and the sampling forms to the laboratory designated on the air bill.
- (5) **Quality control requirements.** If your system serves more than 10,000 people, you must ensure that the quality control requirements listed below are met during your sampling procedures and by the laboratory conducting your analyses. You must also ensure that all method quality control procedures and all UCMR quality control procedures are followed.
- (i) **Sample collection/preservation.** You must follow the sample collection and preservation requirements for the specified method for each of the contaminants in Table 1, in paragraph (a)(3) of this section. These requirements specify sample containers, collection, dechlorination, preservation, storage, sample holding time, and extract storage and/or holding time that you must assure that the laboratory follow.

- (ii) **Laboratory approval for Lists 1, List 2 and List 3.** To be approved to conduct UCMR testing, the laboratory must be certified under § 141.28 for one or more compliance analyses; demonstrate for each analytical method it plans to use for UCMR testing that it can meet the Initial Demonstration of Capability (IDC) requirements detailed in the analytical methods specified in column 3 of Table 1, in paragraph (a)(3) of this section; and successfully participate in the UCMR Proficiency Testing (PT) Program administered by EPA for each analytical method it plans to use for UCMR testing. UCMR laboratory approval decisions will be granted on an individual method basis for the methods listed in column 3 of Table 1 in paragraph (a)(3) of this section for List 1, List 2, and List 3 contaminants. Laboratory approval is contingent upon the capability of the laboratory to post monitoring data to the EPA electronic data reporting system. To participate in the UCMR Laboratory Approval Program, the laboratory must register and complete the necessary application materials by August 1, 2022. Correspondence must be addressed to: UCMR Laboratory Approval Coordinator, USEPA, Technical Support Center, 26 West Martin Luther King Drive, (MS 140), Cincinnati, Ohio 45268; or emailed to EPA at: [UCMR\\_Lab\\_Approval@epa.gov](mailto:UCMR_Lab_Approval@epa.gov).
- (iii) **Minimum Reporting Level.** The MRL is defined by EPA as the quantitation limit achievable, with 95 percent confidence, by 75 percent of laboratories nationwide, assuming the use of good instrumentation and experienced analysts.
- (A) Validation of laboratory performance. Your laboratory must be capable of quantifying each contaminant listed in Table 1, at or below the MRL specified in column 4 of Table 1, in paragraph (a)(3) of this section. You must ensure that the laboratory completes and has on file and available for your inspection, records of two distinct procedures. First, your laboratory must have conducted an IDC involving replicate analyses at or below the MRL as described in this paragraph. Second, for each day that UCMR analyses are conducted by your laboratory, a validation of its ability to quantify each contaminant, at or below the MRL specified in column 4 of Table 1, in paragraph (a)(3) of this section, following the procedure listed in paragraph (a)(5)(iii)(B) of this section, must be performed. The procedure for initial validation of laboratory performance at or below the MRL is as follows:
- (1) All laboratories performing analysis under UCMR must demonstrate that they are capable of meeting data quality objectives at or below the MRL listed in Table 1, column 4, in paragraph (a)(3) of this section.
  - (2) The MRL, or any concentration below the MRL, at which performance is being evaluated, must be contained within the range of calibration. The calibration curve regression model and the range of calibration levels that are used in these performance validation steps must be used in all routine sample analyses used to comply with this regulation. Only straight line or quadratic regression models are allowed. The use of either weighted or unweighted models is permitted. The use of cubic regression models is not permitted.
  - (3) Replicate analyses of at least seven (7) fortified samples in reagent water must be performed at or below the MRL for each analyte, and must be processed through the entire method procedure (i.e., including extraction, where applicable, and with all preservatives).

- (4) A prediction interval of results (PIR), which is based on the estimated arithmetic mean of analytical results and the estimated sample standard deviation of measurement results, must be determined by Equation 1:

$$\text{Equation 1} \quad \text{PIR} = \text{Mean} \pm s \times t_{(df, 1-\alpha/2)} \times \sqrt{1 + \frac{1}{n}}$$

Where:

$t$  is the Student's  $t$  value with  $df$  degrees of freedom and confidence level  $(1-\alpha)$ ,

$s$  is the sample standard deviation of  $n$  replicate samples fortified at the MRL,

$n$  is the number of replicates.

- (5) The values needed to calculate the PIR using Equation 1 are: Number of replicates ( $n$ ); Student's  $t$  value with a two-sided 99% confidence level for  $n$  number of replicates; the average (mean) of at least seven replicates; and the sample standard deviation. Factor 1 is referred to as the Half Range PIR ( $\text{HR}_{\text{PIR}}$ ).

$$\text{HR}_{\text{PIR}} = s \times t_{(df, 1-\alpha/2)} \times \sqrt{1 + \frac{1}{n}}$$

For a certain number of replicates and for a certain confidence level in Student's  $t$ , this factor

$$C = t_{(df, 1-\alpha/2)} \times \sqrt{1 + \frac{1}{n}}$$

is constant, and can be tabulated according to replicate number and confidence level for the Student's  $t$ . Table 3 in this paragraph lists the constant factor ( $C$ ) for replicate sample numbers 7 through 10 with a confidence level of 99% for Student's  $t$ .

- (6) The  $\text{HR}_{\text{PIR}}$  is calculated by Equation 2:

$$\text{Equation 2} \quad \text{HR}_{\text{PIR}} = s \times C$$

- (7) The PIR is calculated by Equation 3:

$$\text{Equation 3} \quad \text{PIR} = \text{Mean} \pm \text{HR}_{\text{PIR}}$$

**TABLE 3—THE CONSTANT FACTOR (C) TO BE MULTIPLIED BY THE STANDARD DEVIATION TO DETERMINE THE HALF RANGE INTERVAL OF THE PIR (STUDENT'S t 99% CONFIDENCE LEVEL) <sup>a</sup>**

Replicates	Degrees of freedom	Constant factor (C) to be multiplied by the standard deviation
7	6	3.963
8	7	3.711
9	8	3.536
10	9	3.409

<sup>a</sup> The critical t-value for a two-sided 99% confidence interval is equivalent to the critical t-value for a one-sided 99.5% confidence interval, due to the symmetry of the t-distribution. PIR = Prediction Interval of Results.

- (8) The lower and upper result limits of the PIR must be converted to percent recovery of the concentration being tested. To pass criteria at a certain level, the PIR lower recovery limits cannot be lower than the lower recovery limits of the QC interval (50%), and the PIR upper recovery limits cannot be greater than the upper recovery limits of the QC interval (150%). When either of the PIR recovery limits falls outside of either bound of the QC interval of recovery (higher than 150% or less than 50%), laboratory performance is not validated at the concentration evaluated. If the PIR limits are contained within both bounds of the QC interval, laboratory performance is validated for that analyte.
- (B) Quality control requirements for validation of laboratory performance at or below the MRL.
  - (1) You must ensure that the calibration curve regression model and that the range of calibration levels that are used in these performance validation steps are used in future routine sample analysis. Only straight line or quadratic regression models are allowed. The use of either weighted or unweighted models is permitted. The use of cubic regression models is not permitted.
  - (2) You must ensure, once your laboratory has performed an IDC as specified in each analytical method (demonstrating that DQOs are met at or below an MRL), that a daily performance check is performed for each analyte and method. A single laboratory blank, fortified at or below the MRL for each analyte, must be processed through the entire method procedure. The measured concentration for each analyte must be converted to a percent recovery, and if the recovery is within 50%-150% (inclusive), the daily performance of the laboratory has been validated. The results for any analyte for which 50%-150% recovery cannot be demonstrated during the daily check are not valid. Laboratories may elect to re-run the daily performance



check sample if the performance for any analyte or analytes cannot be validated. If performance is validated for these analytes, the laboratory performance is considered validated. Alternatively, the laboratory may re-calibrate and repeat the performance validation process for all analytes.

(iv) [Reserved]

(v) **Method defined quality control.** You must ensure that your laboratory analyzes Laboratory Fortified Blanks and conducts Laboratory Performance Checks, as appropriate to the method's requirements, for those methods listed in column 3 in table 1 to paragraph (a)(3) of this section. Each method specifies acceptance criteria for these QC checks.

(vi) **Reporting.** You must require your laboratory, on your behalf, to post and approve these data in EPA's electronic data reporting system, accessible at <https://www.epa.gov/dwucmr>, for your review within 90 days from the sample collection date. You then have 30 days from when the laboratory posts and approves your data to review, approve, and submit the data to the State and EPA, via the agency's electronic data reporting system. If you do not electronically approve and submit the laboratory data to EPA within 30 days of the laboratory posting approved data, the data will be considered approved by you and available for State and EPA review.

(6) **Violation of this rule —**

(i) **Monitoring violations.** Any failure to monitor in accordance with § 141.40(a)(3)-(5) is a monitoring violation.

(ii) **Reporting violations.** Any failure to report in accordance with § 141.35 is a reporting violation.

(b) **Petitions and waivers by States —**

(1) **Governors' petition for additional contaminants.** The Safe Drinking Water Act allows Governors of seven (7) or more States to petition the EPA Administrator to add one or more contaminants to the UCMR Contaminant List in paragraph (a)(3) of this section. The petition must clearly identify the reason(s) for adding the contaminant(s) to the monitoring list, including the potential risk to public health, particularly any information that might be available regarding disproportional risks to the health and safety of children, the expected occurrence documented by any available data, any analytical methods known or proposed to be used to test for the contaminant(s), and any other information that could assist the Administrator in determining which contaminants present the greatest public health concern and should, therefore, be included on the UCMR Contaminant List in paragraph (a)(3) of this section.

(2) **State-wide waivers.** A State can waive monitoring requirements only with EPA approval and under very limited conditions. Conditions and procedures for obtaining a waiver are as follows:

(i) **Application.** A State may apply to EPA for a State-wide waiver from the unregulated contaminant monitoring requirements for PWSs serving more than 10,000 people. To apply for such a waiver, the State must submit an application to EPA that includes the following information: The list of contaminants on the UCMR Contaminant List for which a waiver is requested, along with documentation for each contaminant in the request demonstrating that the contaminants or their parent compounds do not occur naturally in the State, and certifying that during the past 15 years they have not been used, applied, stored, disposed of, released, or detected in the source waters or distribution systems in the State.

- (ii) **Approval.** EPA will review State applications and notify the State whether it accepts or rejects the request. The State must receive written approval from EPA before issuing a State-wide waiver.

(c) **Incorporation by reference.** The standards required in this section are incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at U.S. Environmental Protection Agency, Water Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave. NW, Washington, DC 20004, (202) 566-1744, email [Docket-customerservice@epa.gov](mailto:Docket-customerservice@epa.gov), or go to <https://www.epa.gov/dockets/epa-docket-center-reading-room>, and is available from the sources indicated elsewhere in this paragraph. The material is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov), or go to [www.archives.gov/federal-register/cfr/ibr-locations.html](http://www.archives.gov/federal-register/cfr/ibr-locations.html).

- (1) U.S. Environmental Protection Agency, EPA West, Room 3334, 1301 Constitution Ave. NW, Washington, DC 20004; telephone: (202) 566-1744.
  - (i) Method 200.7, "Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry," Revision 4.4, EMMC Version, 1994. Available at <https://www.epa.gov/esam/method-2007-determination-metals-and-trace-elements-water-and-wastes-inductively-coupled-plasma>.
  - (ii) Method 537.1, "Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry," Version 2.0, 2020. Available at <https://www.epa.gov/water-research/epa-drinking-water-research-methods>.
  - (iii) Method 533, "Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry," November 2019, EPA 815-B-19-020. Available at <https://www.epa.gov/dwanalyticalmethods>.
- (2) American Public Health Association, 800 I Street NW, Washington, DC 20001-3710; telephone: (202) 777-2742; email: [comments@apha.org](mailto:comments@apha.org); [www.apha.org](http://www.apha.org).
  - (i) "Standard Methods for the Examination of Water & Wastewater," 23rd edition (2017).
    - (A) SM 3120 B, "Metals by Plasma Emission Spectroscopy (2017): Inductively Coupled Plasma (ICP) Method."
    - (B) [Reserved]
  - (ii) "Standard Methods Online," approved 1999; <https://www.standardmethods.org>.
    - (A) SM 3120 B, "Metals by Plasma Emission Spectroscopy: Inductively Coupled Plasma (ICP) Method," revised December 14, 2020.
    - (B) [Reserved]
- (3) ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959; telephone: (610) 832-9500; email: [service@astm.org](mailto:service@astm.org); [www.astm.org](http://www.astm.org).
  - (i) ASTM D1976-20, "Standard Test Method for Elements in Water by Inductively-Coupled Plasma Atomic Emission Spectroscopy," approved May 1, 2020.

(ii) [Reserved]

[72 FR 393, Jan. 4, 2007; 72 FR 3916, Jan. 26, 2007, as amended at 77 FR 26098, May 2, 2012; 81 FR 92688, Dec. 20, 2016; 86 FR 73155, Dec. 27, 2021; 87 FR 3679, Jan. 25, 2022]

#### § 141.41 Special monitoring for sodium.

- (a) Suppliers of water for community public water systems shall collect and analyze one sample per plant at the entry point of the distribution system for the determination of sodium concentration levels; samples must be collected and analyzed annually for systems utilizing surface water sources in whole or in part, and at least every three years for systems utilizing solely ground water sources. The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with the State approval, be considered one treatment plant for determining the minimum number of samples. The supplier of water may be required by the State to collect and analyze water samples for sodium more frequently in locations where the sodium content is variable.
- (b) The supplier of water shall report to EPA and/or the State the results of the analyses for sodium within the first 10 days of the month following the month in which the sample results were received or within the first 10 days following the end of the required monitoring period as stipulated by the State, whichever of these is first. If more than annual sampling is required the supplier shall report the average sodium concentration within 10 days of the month following the month in which the analytical results of the last sample used for the annual average was received. The supplier of water shall not be required to report the results to EPA where the State has adopted this regulation and results are reported to the State. The supplier shall report the results to EPA where the State has not adopted this regulation.
- (c) The supplier of water shall notify appropriate local and State public health officials of the sodium levels by written notice by direct mail within three months. A copy of each notice required to be provided by this paragraph shall be sent to EPA and/or the State within 10 days of its issuance. The supplier of water is not required to notify appropriate local and State public health officials of the sodium levels where the State provides such notices in lieu of the supplier.
- (d) Analyses for sodium shall be conducted as directed in § 141.23(k)(1).

[45 FR 57345, Aug. 27, 1980, as amended at 59 FR 62470, Dec. 5, 1994]

#### § 141.42 Special monitoring for corrosivity characteristics.

(a)-(c) [Reserved]

- (d) Community water supply systems shall identify whether the following construction materials are present in their distribution system and report to the State:

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

Copper from piping and alloys, service lines, and home plumbing.

Galvanized piping, service lines, and home plumbing.

Ferrous piping materials such as cast iron and steel.

Asbestos cement pipe.

In addition, States may require identification and reporting of other materials of construction present in distribution systems that may contribute contaminants to the drinking water, such as:

Vinyl lined asbestos cement pipe.

Coal tar lined pipes and tanks.

[45 FR 57346, Aug. 27, 1980; 47 FR 10999, Mar. 12, 1982, as amended at 59 FR 62470, Dec. 5, 1994]

## Subpart F—Maximum Contaminant Level Goals and Maximum Residual Disinfectant Level Goals

### § 141.50 Maximum contaminant level goals for organic contaminants.

(a) MCLGs are zero for the following contaminants:

- (1) Benzene.
- (2) Vinyl chloride.
- (3) Carbon tetrachloride.
- (4) 1,2-dichloroethane.
- (5) Trichloroethylene.
- (6) Acrylamide.
- (7) Alachlor.
- (8) Chlordane.
- (9) Dibromochloropropane.
- (10) 1,2-Dichloropropane.
- (11) Epichlorohydrin.
- (12) Ethylene dibromide.
- (13) Heptachlor.
- (14) Heptachlor epoxide.
- (15) Pentachlorophenol.
- (16) Polychlorinated biphenyls (PCBs).
- (17) Tetrachloroethylene.
- (18) Toxaphene.
- (19) Benzo[a]pyrene.
- (20) Dichloromethane (methylene chloride).

- (21) Di(2-ethylhexyl)phthalate.
- (22) Hexachlorobenzene.
- (23) 2,3,7,8-TCDD (Dioxin).
- (24) PFOA.
- (25) PFOS.

(b) MCLGs for the following contaminants are as indicated:

Contaminant	MCLG in mg/l (unless otherwise noted)
(1) 1,1-Dichloroethylene	0.007
(2) 1,1,1-Trichloroethane	0.20
(3) para-Dichlorobenzene	0.075
(4) Aldicarb	0.001
(5) Aldicarb sulfoxide	0.001
(6) Aldicarb sulfone	0.001
(7) Atrazine	0.003
(8) Carbofuran	0.04
(9) o-Dichlorobenzene	0.6
(10) cis-1,2-Dichloroethylene	0.07
(11) trans-1,2-Dichloroethylene	0.1
(12) 2,4-D	0.07
(13) Ethylbenzene	0.7
(14) Lindane	0.0002
(15) Methoxychlor	0.04
(16) Monochlorobenzene	0.1
(17) Styrene	0.1
(18) Toluene	1
(19) 2,4,5-TP	0.05
(20) Xylenes (total)	10
(21) Dalapon	0.2
(22) Di(2-ethylhexyl)adipate	.4
(23) Dinoseb	.007

<sup>1</sup> The PFAS Mixture Hazard Index (HI) is the sum of component hazard quotients (HQs), which are calculated by dividing the measured component PFAS concentration in water by the corresponding contaminant's health-based water concentration (HBWC) when expressed in the same units (shown in ng/l). The HBWC for PFHxS is 10 ng/l; the HBWC for HFPO-DA is 10 ng/l; the HBWC for PFNA is 10 ng/l; and the HBWC for PFBS is 2000 ng/l. A PFAS Mixture Hazard Index greater than 1 (unitless) indicates an exceedance of the health protective level and indicates potential human health risk from the PFAS mixture in drinking water.

Contaminant	MCLG in mg/l (unless otherwise noted)
(24) Diquat	.02
(25) Endothall	.1
(26) Endrin	.002
(27) Glyphosate	.7
(28) Hexachlorocyclopentadiene	.05
(29) Oxamyl (Vydate)	.2
(30) Picloram	.5
(31) Simazine	.004
(32) 1,2,4-Trichlorobenzene	.07
(33) 1,1,2-Trichloroethane	.003
(34) Hazard Index PFAS (HFPO-DA, PFBS, PFHxS, and PFNA)	1 (unitless). <sup>1</sup>
(35) HFPO-DA	0.00001.
(36) PFHxS	0.00001.
(37) PFNA	0.00001.

<sup>1</sup> The PFAS Mixture Hazard Index (HI) is the sum of component hazard quotients (HQs), which are calculated by dividing the measured component PFAS concentration in water by the corresponding contaminant's health-based water concentration (HBWC) when expressed in the same units (shown in ng/l). The HBWC for PFHxS is 10 ng/l; the HBWC for HFPO-DA is 10 ng/l; the HBWC for PFNA is 10 ng/l; and the HBWC for PFBS is 2000 ng/l. A PFAS Mixture Hazard Index greater than 1 (unitless) indicates an exceedance of the health protective level and indicates potential human health risk from the PFAS mixture in drinking water.

Hazard Index = ([HFPO-DA<sub>water</sub> ng/l]/[10 ng/l]) + ([PFBS<sub>water</sub> ng/l]/[2000 ng/l]) + ([PFNA<sub>water</sub> ng/l]/[10 ng/l]) + ([PFHxS<sub>water</sub> ng/l]/[10 ng/l])

- HBWC = health-based water concentration
- HQ = hazard quotient
- ng/l = nanograms per liter
- PFAS<sub>water</sub> = the concentration of a specific PFAS in water

[50 FR 46901, Nov. 13, 1985, as amended at 52 FR 20674, June 2, 1987; 52 FR 25716, July 8, 1987; 56 FR 3592, Jan. 30, 1991; 56 FR 30280, July 1, 1991; 57 FR 31846, July 17, 1992; 89 FR 32744, April 25, 2024]

§ 141.51 Maximum contaminant level goals for inorganic contaminants.

(a) [Reserved]

(b) MCLGs for the following contaminants are as indicated:

Contaminant	MCLG (mg/l)
Antimony	0.006
Arsenic	zero <sup>1</sup>
Asbestos	7 Million fibers/liter (longer than 10 µm).
Barium	2
Beryllium	.004
Cadmium	0.005
Chromium	0.1
Copper	1.3
Cyanide (as free Cyanide)	.2
Fluoride	4.0
Lead	zero
Mercury	0.002
Nitrate	10 (as Nitrogen).
Nitrite	1 (as Nitrogen).
Total Nitrate + Nitrite	10 (as Nitrogen).
Selenium	0.05
Thallium	.0005

<sup>1</sup> This value for arsenic is effective January 23, 2006. Until then, there is no MCLG.

[50 FR 47155, Nov. 14, 1985, as amended at 52 FR 20674, June 2, 1987; 56 FR 3593, Jan. 30, 1991; 56 FR 26548, June 7, 1991; 56 FR 30280, July 1, 1991; 57 FR 31846, July 17, 1992; 60 FR 33932, June 29, 1995; 66 FR 7063, Jan. 22, 2001]

## § 141.52 Maximum contaminant level goals for microbiological contaminants.

(a) MCLGs for the following contaminants are as indicated:

Contaminant	MCLG
(1) <i>Giardia lamblia</i>	zero
(2) Viruses	zero
(3) <i>Legionella</i>	zero
(4) Total coliforms (including fecal) coliforms and <i>Escherichia coli</i>	zero
(5) <i>Cryptosporidium</i>	zero

Contaminant	MCLG
(6) <i>Escherichia coli</i> ( <i>E. coli</i> )	zero

- (b) The MCLG identified in paragraph (a)(4) of this section is applicable until March 31, 2016. The MCLG identified in paragraph (a)(6) of this section is applicable beginning April 1, 2016.

[78 FR 10347, Feb. 13, 2013]

### § 141.53 Maximum contaminant level goals for disinfection byproducts.

MCLGs for the following disinfection byproducts are as indicated:

Disinfection byproduct	MCLG (mg/L)
Bromodichloromethane	zero
Bromoform	zero
Bromate	zero
Chlorite	0.8
Chloroform	0.07
Dibromochloromethane	0.06
Dichloroacetic acid	zero
Monochloroacetic acid	0.07
Trichloroacetic acid	0.02

[63 FR 69465, Dec. 16, 1998, as amended at 65 FR 34405, May 30, 2000; 71 FR 478, Jan. 4, 2006]

### § 141.54 Maximum residual disinfectant level goals for disinfectants.

MRDLGs for disinfectants are as follows:

Disinfectant residual	MRDLG(mg/L)
Chlorine	4 (as Cl <sub>2</sub> ).
Chloramines	4 (as Cl <sub>2</sub> ).
Chlorine dioxide	0.8 (as ClO <sub>2</sub> )

[63 FR 69465, Dec. 16, 1998]



## § 141.55 Maximum contaminant level goals for radionuclides.

MCLGs for radionuclides are as indicated in the following table:

Contaminant	MCLG
1. Combined radium-226 and radium-228	Zero.
2. Gross alpha particle activity (excluding radon and uranium)	Zero.
3. Beta particle and photon radioactivity	Zero.
4. Uranium	Zero.

[65 FR 76748, Dec. 7, 2000]

## Subpart G—National Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels

### § 141.60 Effective dates.

(a) The effective dates for § 141.61 are as follows:

- (1) The effective date for paragraphs (a)(1) through (a)(8) of § 141.61 is January 9, 1989.
- (2) The effective date for paragraphs (a)(9) through (a)(18) and (c)(1) through (c)(18) of § 141.61 is July 30, 1992.
- (3) The effective date for paragraphs (a)(19) through (a)(21), (c)(19) through (c)(25), and (c)(27) through (c)(33) of § 141.61 is January 17, 1994. The effective date of § 141.61(c)(26) is August 17, 1992.
- (4) The effective date for § 141.61(c)(2)(i) through (vii) is April 26, 2029.

(b) The effective dates for § 141.62 are as follows:

- (1) The effective date of paragraph (b)(1) of § 141.62 is October 2, 1987.
- (2) The effective date for paragraphs (b)(2) and (b)(4) through (b)(10) of § 141.62 is July 30, 1992.
- (3) The effective date for paragraphs (b)(11) through (b)(15) of § 141.62 is January 17, 1994.
- (4) The effective date for § 141.62(b)(16) is January 23, 2006.

[56 FR 3593, Jan. 30, 1991, as amended at 57 FR 31846, July 17, 1992; 59 FR 34324, July 1, 1994; 66 FR 7063, Jan. 22, 2001; 89 FR 32744, Apr. 26, 2024; 89 FR 49102, June 11, 2024]

### § 141.61 Maximum contaminant levels for organic contaminants.

(a) The following maximum contaminant levels for volatile organic contaminants apply to community and non-transient, non-community water systems.

**Table 1 to Paragraph (a)—Maximum Contaminant Levels for Volatile Organic Contaminants**

CAS No.	Contaminant	MCL (mg/l)
(1) 75-01-4	Vinyl chloride	0.002
(2) 71-43-2	Benzene	0.005
(3) 56-23-5	Carbon tetrachloride	0.005
(4) 107-06-2	1,2-Dichloroethane	0.005
(5) 79-01-6	Trichloroethylene	0.005
(6) 106-46-7	para-Dichlorobenzene	0.075
(7) 75-35-4	1,1-Dichloroethylene	0.007
(8) 71-55-6	1,1,1-Trichloroethane	0.2
(9) 156-59-2	cis-1,2-Dichloroethylene	0.07
(10) 78-87-5	1,2-Dichloropropane	0.005
(11) 100-41-4	Ethylbenzene	0.7
(12) 108-90-7	Monochlorobenzene	0.1
(13) 95-50-1	o-Dichlorobenzene	0.6
(14) 100-42-5	Styrene	0.1
(15) 127-18-4	Tetrachloroethylene	0.005
(16) 108-88-3	Toluene	1
(17) 156-60-5	trans-1,2-Dichloroethylene	0.1
(18) 1330-20-7	Xylenes (total)	10
(19) 75-09-2	Dichloromethane	0.005
(20) 120-82-1	1,2,4-Trichloro- benzene	.07
(21) 79-00-5	1,1,2-Trichloro- ethane	.005

- (b) The Administrator, pursuant to section 1412 of the Act, hereby identifies as indicated in table 2 to this paragraph (b) granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX) as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in paragraphs (a) and (c) of this section, except for per- and polyfluoroalkyl substances (PFAS).

**Table 2 to Paragraph (b)—BAT for Organic Contaminants in Paragraphs (a) and (c) of This Section, Except for PFAS**

**BAT FOR ORGANIC CONTAMINANTS LISTED IN § 141.61 (a) AND (c)**

CAS No.	Contaminant	GAC	PTA	OX
15972-60-8	Alachlor	X		
116-06-3	Aldicarb	X		
1646-88-4	Aldicarb sulfone	X		
1646-87-3	Aldicarb sulfoxide	X		
1912-24-9	Atrazine	X		
71-43-2	Benzene	X	X	
50-32-8	Benzo[a]pyrene	X		
1563-66-2	Carbofuran	X		
56-23-5	Carbon tetrachloride	X	X	
57-74-9	Chlordane	X		
75-99-0	Dalapon	X		
94-75-7	2,4-D	X		
103-23-1	Di (2-ethylhexyl) adipate	X	X	
117-81-7	Di (2-ethylhexyl) phthalate	X		
96-12-8	Dibromochloropropane (DBCP)	X	X	
95-50-1	o-Dichlorobenzene	X	X	
106-46-7	para-Dichlorobenzene	X	X	
107-06-2	1,2-Dichloroethane	X	X	
75-35-4	1,1-Dichloroethylene	X	X	
156-59-2	cis-1,2-Dichloroethylene	X	X	
156-60-5	trans-1,2-Dichloroethylene	X	X	
75-09-2	Dichloromethane		X	
78-87-5	1,2-Dichloropropane	X	X	
88-85-7	Dinoseb	X		
85-00-7	Diquat	X		
145-73-3	Endothall	X		
72-20-8	Endrin	X		
100-41-4	Ethylbenzene	X	X	
106-93-4	Ethylene Dibromide (EDB)	X	X	
1071-83-6	Glyphosate			X
76-44-8	Heptachlor	X		
1024-57-3	Heptachlor epoxide	X		
118-74-1	Hexachlorobenzene	X		
77-47-3	Hexachlorocyclopentadiene	X	X	

CAS No.	Contaminant	GAC	PTA	OX
58-89-9	Lindane	X		
72-43-5	Methoxychlor	X		
108-90-7	Monochlorobenzene	X	X	
23135-22-0	Oxamyl (Vydate)	X		
87-86-5	Pentachlorophenol	X		
1918-02-1	Picloram	X		
1336-36-3	Polychlorinated biphenyls (PCB)	X		
122-34-9	Simazine	X		
100-42-5	Styrene	X	X	
1746-01-6	2,3,7,8-TCDD (Dioxin)	X		
127-18-4	Tetrachloroethylene	X	X	
108-88-3	Toluene	X	X	
8001-35-2	Toxaphene	X		
93-72-1	2,4,5-TP (Silvex)	X		
120-82-1	1,2,4-Trichlorobenzene	X	X	
71-55-6	1,1,1-Trichloroethane	X	X	
79-00-5	1,1,2-Trichloroethane	X	X	
79-01-6	Trichloroethylene	X	X	
75-01-4	Vinyl chloride		X	
1330-20-7	Xylene	X	X	

- (c) The following maximum contaminant levels (MCLs) in paragraphs (c)(1) and (2) of this section for synthetic organic contaminants apply to community water systems and non-transient, non-community water systems; paragraph (c)(2) of this section also contains health-based water concentrations (HBWCs) for selected per- and poly-fluoroalkyl substances (PFAS) used in calculating the Hazard Index.

(1) *MCLs for Synthetic Organic Contaminants, Except for PFAS.*

CAS No.	Contaminant	MCL (mg/l)
(i) 15972-60-8	Alachlor	0.002
(ii) 116-06-3	Aldicarb	0.003
(iii) 1646-87-3	Aldicarb sulfoxide	0.004
(iv) 1646-87-4	Aldicarb sulfone	0.002
(v) 1912-24-9	Atrazine	0.003
(vi) 1563-66-2	Carbofuran	0.04
(vii) 57-74-9	Chlordane	0.002

CAS No.	Contaminant	MCL (mg/l)
(viii) 96-12-8	Dibromochloropropane	0.0002
(ix) 94-75-7	2,4-D	0.07
(x) 106-93-4	Ethylene dibromide	0.00005
(xi) 76-44-8	Heptachlor	0.0004
(xii) 1024-57-3	Heptachlor epoxide	0.0002
(xiii) 58-89-9	Lindane	0.0002
(xiv) 72-43-5	Methoxychlor	0.04
(xv) 1336-36-3	Polychlorinated biphenyls	0.0005
(xvi) 87-86-5	Pentachlorophenol	0.001
(xvii) 8001-35-2	Toxaphene	0.003
(xviii) 93-72-1	2,4,5-TP	0.05
(xix) 50-32-8	Benzo[a]pyrene	0.0002
(xx) 75-99-0	Dalapon	0.2
(xxi) 103-23-1	Di(2-ethylhexyl) adipate	0.4
(xxii) 117-81-7	Di(2-ethylhexyl) phthalate	0.006
(xxiii) 88-85-7	Dinoseb	0.007
(xxiv) 85-00-7	Diquat	0.02
(xxv) 145-73-3	Endothall	0.1
(xxvi) 72-20-8	Endrin	0.002
(xvii) 1071-53-6	Glyphosate	0.7
(xxviii) 118-74-1	Hexachlorobenzene	0.001
(xxix) 77-47-4	Hexachlorocyclopentadiene	0.05
(xxx) 23135-22-0	Oxamyl (Vydate)	0.2
(xxxi) 1918-02-1	Picloram	0.5
(xxxii) 122-34-9	Simazine	0.004

CAS No.	Contaminant	MCL (mg/l)
(xxxiii) 1746-01-6	2,3,7,8-TCDD (Dioxin)	$3 \times 10^{-8}$

(2) **MCLs and HBWCs for PFAS.**

CAS. No.	Contaminant	MCL (mg/l) (unless otherwise noted)	HBWC (mg/l) for Hazard Index calculation
(i) Not applicable	Hazard Index PFAS (HFPO-DA, PFBS, PFHxS, and PFNA)	1 (unitless) <sup>1</sup>	Not applicable.
(ii) 122499-17-6	HFPO-DA	0.00001	0.00001.
(iii) 45187-15-3	PFBS	No individual MCL	0.002.
(iv) 108427-53-8	PFHxS	0.00001	0.00001.
(v) 72007-68-2	PFNA	0.00001	0.00001.
(vi) 45285-51-6	PFOA	0.0000040	Not applicable.
(vii) 45298-90-6	PFOS	0.0000040	Not applicable.

<sup>1</sup> The PFAS Mixture Hazard Index (HI) is the sum of component hazard quotients (HQs), which are calculated by dividing the measured component PFAS concentration in water by the relevant health-based water concentration when expressed in the same units (shown in ng/l for simplification). The HBWC for PFHxS is 10 ng/l; the HBWC for HFPO-DA is 10 ng/l; the HBWC for PFNA is 10 ng/l; and the HBWC for PFBS is 2000 ng/l.

$$\text{Hazard Index} = ([\text{HFPO-DA}_{\text{water}} \text{ ng/l}]/[10 \text{ ng/l}]) + ([\text{PFBS}_{\text{water}} \text{ ng/l}]/[2000 \text{ ng/l}]) + ([\text{PFNA}_{\text{water}} \text{ ng/l}]/[10 \text{ ng/l}]) + ([\text{PFHxS}_{\text{water}} \text{ ng/l}]/[10 \text{ ng/l}])$$

HBWC = health-based water concentration

HQ = hazard quotient

ng/l = nanograms per liter

PFAS<sub>water</sub> = the concentration of a specific PFAS in water

- (d) The Administrator, pursuant to section 1412 of the Act, hereby identifies in table 3 to this paragraph (d) the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant levels for all regulated PFAS identified in paragraph (c) of this section:

**TABLE 3 TO PARAGRAPH (d)—BEST AVAILABLE TECHNOLOGIES FOR PFAS LISTED IN PARAGRAPH (c) OF THIS SECTION**

Contaminant	BAT
Hazard Index PFAS (HFPO-DA, PFBS, PFHxS, and PFNA)	Anion exchange, GAC, reverse osmosis, nanofiltration.
HFPO-DA	Anion exchange, GAC, reverse osmosis, nanofiltration.
PFHxS	Anion exchange, GAC, reverse osmosis, nanofiltration.
PFNA	Anion exchange, GAC, reverse osmosis, nanofiltration.
PFOA	Anion exchange, GAC, reverse osmosis, nanofiltration.
PFOS	Anion exchange, GAC, reverse osmosis,

Contaminant	BAT
	nanofiltration.

- (e) The Administrator, pursuant to section 1412 of the Act, hereby identifies in table 4 to this paragraph (e) the affordable technology, treatment technique, or other means available to systems serving 10,000 persons or fewer for achieving compliance with the maximum contaminant levels for all regulated PFAS identified in paragraph (c) of this section:

TABLE 4 TO PARAGRAPH (e)—SMALL SYSTEM COMPLIANCE TECHNOLOGIES (SSCTs) FOR PFAS

Small system compliance technology <sup>1</sup>	Affordable for listed small system categories <sup>2</sup>
Granular Activated Carbon	All size categories.
Anion Exchange	All size categories.
Reverse Osmosis, Nanofiltration <sup>3</sup>	3,301-10,000.

<sup>1</sup> Section 1412(b)(4)(E)(ii) of SDWA specifies that SSCTs must be affordable and technically feasible for small systems.

<sup>2</sup> The Act (*ibid.*) specifies three categories of small systems: (i) those serving 25 or more, but fewer than 501, (ii) those serving more than 500, but fewer than 3,301, and (iii) those serving more than 3,300, but fewer than 10,001.

<sup>3</sup> “Technologies reject a large volume of water and may not be appropriate for areas where water quantity may be an issue.

[56 FR 3593, Jan. 30, 1991, as amended at 56 FR 30280, July 1, 1991; 57 FR 31846, July 17, 1992; 59 FR 34324, July 1, 1994; 89 FR 32744, Apr. 26, 2024; 89 FR 49102, June 11, 2024]

§ 141.62 Maximum contaminant levels for inorganic contaminants.

- (a) [Reserved]
- (b) The maximum contaminant levels for inorganic contaminants specified in paragraphs (b) (2)-(6), (b)(10), and (b) (11)-(16) of this section apply to community water systems and non-transient, non-community water systems. The maximum contaminant level specified in paragraph (b)(1) of this section only applies



to community water systems. The maximum contaminant levels specified in (b)(7), (b)(8), and (b)(9) of this section apply to community water systems; non-transient, non-community water systems; and transient non-community water systems.

Contaminant	MCL (mg/l)
(1) Fluoride	4.0
(2) Asbestos	7 Million Fibers/liter (longer than 10 µm).
(3) Barium	2
(4) Cadmium	0.005
(5) Chromium	0.1
(6) Mercury	0.002
(7) Nitrate	10 (as Nitrogen)
(8) Nitrite	1 (as Nitrogen)
(9) Total Nitrate and Nitrite	10 (as Nitrogen)
(10) Selenium	0.05
(11) Antimony	0.006
(12) Beryllium	0.004
(13) Cyanide (as free Cyanide)	0.2
(14) [Reserved]	
(15) Thallium	0.002
(16) Arsenic	0.010

- (c) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant levels for inorganic contaminants identified in paragraph (b) of this section, except fluoride:

### BAT FOR INORGANIC COMPOUNDS LISTED IN SECTION 141.62(b)

Chemical Name	BAT(s)
Antimony	2,7
Arsenic <sup>4</sup>	1, 2, 5, 6, 7, 9, 12 <sup>5</sup>
Asbestos	2,3,8
Barium	5,6,7,9

<sup>1</sup> BAT only if influent Hg concentrations  $\leq 10\mu\text{g/l}$ .

<sup>2</sup> BAT for Chromium III only.

<sup>3</sup> BAT for Selenium IV only.

<sup>4</sup> BATs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.

<sup>5</sup> To obtain high removals, iron to arsenic ratio must be at least 20:1.

Chemical Name	BAT(s)
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6 <sup>2</sup> ,7
Cyanide	5,7,13
Mercury	2 <sup>1</sup> ,4,6 <sup>1</sup> ,7 <sup>1</sup>
Nickel	5,6,7
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2 <sup>3</sup> ,6,7,9
Thallium	1,5

<sup>1</sup> BAT only if influent Hg concentrations  $\leq 10\mu\text{g}/1$ .

<sup>2</sup> BAT for Chromium III only.

<sup>3</sup> BAT for Selenium IV only.

<sup>4</sup> BATs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.

<sup>5</sup> To obtain high removals, iron to arsenic ratio must be at least 20:1.

## Key to BATS in Table

1 = Activated Alumina

2 = Coagulation/Filtration (not BAT for systems <500 service connections)

3 = Direct and Diatomite Filtration

4 = Granular Activated Carbon

5 = Ion Exchange

6 = Lime Softening (not BAT for systems <500 service connections)

7 = Reverse Osmosis

8 = Corrosion Control

9 = Electrodialysis

10 = Chlorine

11 = Ultraviolet

12 = Oxidation/Filtration

13 = Alkaline Chlorination (pH ≥8.5)

- (d) The Administrator, pursuant to section 1412 of the Act, hereby identifies in the following table the affordable technology, treatment technique, or other means available to systems serving 10,000 persons or fewer for achieving compliance with the maximum contaminant level for arsenic:

### SMALL SYSTEM COMPLIANCE TECHNOLOGIES (SSCTs)<sup>1</sup> FOR ARSENIC<sup>2</sup>

Small system compliance technology	Affordable for listed small system categories <sup>3</sup>
Activated Alumina (centralized)	All size categories.
Activated Alumina (Point-of-Use) <sup>4</sup>	All size categories.
Coagulation/Filtration <sup>5</sup>	501-3,300, 3,301-10,000.
Coagulation-assisted Microfiltration	501-3,300, 3,301-10,000.
Electrodialysis reversal <sup>6</sup>	501-3,300, 3,301-10,000.
Enhanced coagulation/filtration	All size categories
Enhanced lime softening (pH>10.5)	All size categories.
Ion Exchange	All size categories.
Lime Softening <sup>5</sup>	501-3,300, 3,301-10,000.
Oxidation/Filtration <sup>7</sup>	All size categories.
Reverse Osmosis (centralized) <sup>6</sup>	501-3,300, 3,301-10,000.
Reverse Osmosis (Point-of-Use) <sup>4</sup>	All size categories.

<sup>1</sup> Section 1412(b)(4)(E)(ii) of SDWA specifies that SSCTs must be affordable and technically feasible for small systems.

<sup>2</sup> SSCTs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.

<sup>3</sup> The Act (*ibid.*) specifies three categories of small systems: (i) those serving 25 or more, but fewer than 501, (ii) those serving more than 500, but fewer than 3,301, and (iii) those serving more than 3,300, but fewer than 10,001.

<sup>4</sup> When POU or POE devices are used for compliance, programs to ensure proper long-term operation, maintenance, and monitoring must be provided by the water system to ensure adequate performance.

<sup>5</sup> Unlikely to be installed solely for arsenic removal. May require pH adjustment to optimal range if high removals are needed.

<sup>6</sup> Technologies reject a large volume of water—may not be appropriate for areas where water quantity may be an issue.

<sup>7</sup> To obtain high removals, iron to arsenic ratio must be at least 20:1.

[56 FR 3594, Jan. 30, 1991, as amended at 56 FR 30280, July 1, 1991; 57 FR 31847, July 17, 1992; 59 FR 34325, July 1, 1994; 60 FR 33932, June 29, 1995; 66 FR 7063, Jan. 22, 2001; 68 FR 14506, Mar. 25, 2003; 69 FR 38855, June 29, 2004]

### § 141.63 Maximum contaminant levels (MCLs) for microbiological contaminants.

- (a) Until March 31, 2016, the total coliform MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density.

- (1) For a system that collects at least 40 samples per month, if no more than 5.0 percent of the samples collected during a month are total coliform-positive, the system is in compliance with the MCL for total coliforms.
- (2) For a system that collects fewer than 40 samples per month, if no more than one sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliforms.
- (b) Until March 31, 2016, any fecal coliform-positive repeat sample or *E. coli*-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or *E. coli*-positive routine sample, constitutes a violation of the MCL for total coliforms. For purposes of the public notification requirements in subpart Q of this part, this is a violation that may pose an acute risk to health.
- (c) Beginning April 1, 2016, a system is in compliance with the MCL for *E. coli* for samples taken under the provisions of subpart Y of this part unless any of the conditions identified in paragraphs (c)(1) through (c)(4) of this section occur. For purposes of the public notification requirements in subpart Q of this part, violation of the MCL may pose an acute risk to health.
  - (1) The system has an *E. coli*-positive repeat sample following a total coliform-positive routine sample.
  - (2) The system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample.
  - (3) The system fails to take all required repeat samples following an *E. coli*-positive routine sample.
  - (4) The system fails to test for *E. coli* when any repeat sample tests positive for total coliform.
- (d) Until March 31, 2016, a public water system must determine compliance with the MCL for total coliforms in paragraphs (a) and (b) of this section for each month in which it is required to monitor for total coliforms. Beginning April 1, 2016, a public water system must determine compliance with the MCL for *E. coli* in paragraph (c) of this section for each month in which it is required to monitor for total coliforms.
- (e) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant level for total coliforms in paragraphs (a) and (b) of this section and for achieving compliance with the maximum contaminant level for *E. coli* in paragraph (c) of this section:
  - (1) Protection of wells from fecal contamination by appropriate placement and construction;
  - (2) Maintenance of a disinfectant residual throughout the distribution system;
  - (3) Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, cross connection control, and continual maintenance of positive water pressure in all parts of the distribution system;
  - (4) Filtration and/or disinfection of surface water, as described in subparts H, P, T, and W of this part, or disinfection of ground water, as described in subpart S of this part, using strong oxidants such as chlorine, chlorine dioxide, or ozone; and
  - (5) For systems using ground water, compliance with the requirements of an EPA-approved State Wellhead Protection Program developed and implemented under section 1428 of the SDWA.

- (f) The Administrator, pursuant to section 1412 of the Act, hereby identifies the technology, treatment techniques, or other means available identified in paragraph (e) of this section as affordable technology, treatment techniques, or other means available to systems serving 10,000 or fewer people for achieving compliance with the maximum contaminant level for total coliforms in paragraphs (a) and (b) of this section and for achieving compliance with the maximum contaminant level for *E. coli* in paragraph (c) of this section.

[78 FR 10347, Feb. 13, 2013]

#### § 141.64 Maximum contaminant levels for disinfection byproducts.

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

Disinfection byproduct	MCL (mg/L)
Bromate	0.010
Chlorite	1.0

- (1) **Compliance dates for CWSs and NTNCWSs.** Subpart H systems serving 10,000 or more persons must comply with this paragraph (a) beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this paragraph (a) beginning January 1, 2004.
- (2) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for bromate and chlorite identified in this paragraph (a):

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

- (b) TTHM and HAA5.

- (1) Subpart L—RAA compliance.

- (i) Compliance dates. Subpart H systems serving 10,000 or more persons must comply with this paragraph (b)(1) beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this paragraph (b)(1) beginning January 1, 2004. All systems must comply with these MCLs until the date specified for subpart V compliance in § 141.620(c).

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

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

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

(2) Subpart V—LRAA compliance.

- (i) Compliance dates. The subpart V MCLs for TTHM and HAA5 must be complied with as a locational running annual average at each monitoring location beginning the date specified for subpart V compliance in § 141.620(c).

Disinfection byproduct	MCL (mg/L)
Total trihalomethanes (TTHM)	0.080

Disinfection byproduct	MCL (mg/L)
Haloacetic acids (five) (HAA5)	0.060

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

Disinfection byproduct	Best available technology
Total trihalomethanes (TTHM) and Haloacetic acids (five) (HAA5)	Enhanced coagulation or enhanced softening, plus GAC10; or nanofiltration with a molecular weight cutoff $\leq 1000$ Daltons; or GAC20

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

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

[71 FR 478, Jan. 4, 2006]

## § 141.65 Maximum residual disinfectant levels.

- (a) Maximum residual disinfectant levels (MRDLs) are as follows:

Disinfectant residual	MRDL (mg/L)
Chlorine	4.0 (as $\text{Cl}_2$ ).

Disinfectant residual	MRDL (mg/L)
Chloramines	4.0 (as Cl <sub>2</sub> ).
Chlorine dioxide	0.8 (as ClO <sub>2</sub> ).

(b) **Compliance dates —**

- (1) **CWSs and NTNCWSs.** Subpart H systems serving 10,000 or more persons must comply with this section beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this subpart beginning January 1, 2004.
- (2) **Transient NCWSs.** Subpart H systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.
- (c) The Administrator, pursuant to Section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum residual disinfectant levels identified in paragraph (a) of this section: control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels.

[63 FR 69465, Dec. 16, 1998, as amended at 66 FR 3776, Jan. 16, 2001]

**§ 141.66 Maximum contaminant levels for radionuclides.**

- (a) [Reserved]
- (b) **MCL for combined radium-226 and -228.** The maximum contaminant level for combined radium-226 and radium-228 is 5 pCi/L. The combined radium-226 and radium-228 value is determined by the addition of the results of the analysis for radium-226 and the analysis for radium-228.
- (c) **MCL for gross alpha particle activity (excluding radon and uranium).** The maximum contaminant level for gross alpha particle activity (including radium-226 but excluding radon and uranium) is 15 pCi/L.
- (d) **MCL for beta particle and photon radioactivity.**
  - (1) The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water must not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year (mrem/year).
  - (2) Except for the radionuclides listed in table A, the concentration of man-made radionuclides causing 4 mrem total body or organ dose equivalents must be calculated on the basis of 2 liter per day drinking water intake using the 168 hour data list in "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure," NBS (National Bureau of Standards) Handbook 69 as amended August 1963, U.S. Department of Commerce. This incorporation by reference was approved by the Director of the



Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of this document are available from the National Technical Information Service, NTIS ADA 280 282, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-6847. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW., Washington, DC 20460; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html). If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed 4 mrem/year.

**TABLE A—AVERAGE ANNUAL CONCENTRATIONS ASSUMED TO PRODUCE: A TOTAL BODY OR ORGAN DOSE OF 4 MREM/YR**

1. Radionuclide	Critical organ	pCi per liter
2. Tritium	Total body	20,000
3. Strontium-90	Bone Marrow	8

(e) **MCL for uranium.** The maximum contaminant level for uranium is 30 µg/L.

(f) **Compliance dates.**

(1) Compliance dates for combined radium-226 and -228, gross alpha particle activity, gross beta particle and photon radioactivity, and uranium: Community water systems must comply with the MCLs listed in paragraphs (b), (c), (d), and (e) of this section beginning December 8, 2003 and compliance shall be determined in accordance with the requirements of §§ 141.25 and 141.26. Compliance with reporting requirements for the radionuclides under appendix A to subpart O and appendices A and B to subpart Q is required on December 8, 2003.

(2) [Reserved]

(g) **Best available technologies (BATs) for radionuclides.** The Administrator, pursuant to section 1412 of the Act, hereby identifies as indicated in the following table the best technology available for achieving compliance with the maximum contaminant levels for combined radium-226 and -228, uranium, gross alpha particle activity, and beta particle and photon radioactivity.

**TABLE B—BAT FOR COMBINED RADIUM-226 AND RADIUM-228, URANIUM, GROSS ALPHA PARTICLE ACTIVITY, AND BETA PARTICLE AND PHOTON RADIOACTIVITY**

Contaminant	BAT
1. Combined radium-226 and radium-228	Ion exchange, reverse osmosis, lime softening.
2. Uranium	Ion exchange, reverse osmosis, lime softening,

Contaminant	BAT
3. Gross alpha particle activity (excluding Radon and Uranium)	coagulation/filtration. Reverse osmosis.
4. Beta particle and photon radioactivity	Ion exchange, reverse osmosis.

(h) *Small systems compliance technologies list for radionuclides.*

**TABLE C—LIST OF SMALL SYSTEMS COMPLIANCE TECHNOLOGIES FOR RADIONUCLIDES AND LIMITATIONS TO USE**

Unit technologies	Limitations (see footnotes)	Operator skill level required <sup>1</sup>	Raw water quality range and considerations. <sup>1</sup>
1. Ion exchange (IE)	(a)	Intermediate	All ground waters.
2. Point of use (POU) <sup>2</sup> IE	(b)	Basic	All ground waters.

<sup>1</sup> National Research Council (NRC). *Safe Water from Every Tap: Improving Water Service to Small Communities*. National Academy Press. Washington, D.C. 1997.

<sup>2</sup> A POU, or "point-of-use" technology is a treatment device installed at a single tap used for the purpose of reducing contaminants in drinking water at that one tap. POU devices are typically installed at the kitchen tap. See the April 21, 2000 NODA for more details.

*Limitations Footnotes: Technologies for Radionuclides:*

<sup>a</sup> The regeneration solution contains high concentrations of the contaminant ions. Disposal options should be carefully considered before choosing this technology.

<sup>b</sup> When POU devices are used for compliance, programs for long-term operation, maintenance, and monitoring must be provided by water utility to ensure proper performance.

<sup>c</sup> Reject water disposal options should be carefully considered before choosing this technology. See other RO limitations described in the SWTR Compliance Technologies Table.

<sup>d</sup> The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small surface water systems.

<sup>e</sup> Removal efficiencies can vary depending on water quality.

<sup>f</sup> This technology may be very limited in application to small systems. Since the process requires static mixing, detention basins, and filtration, it is most applicable to systems with sufficiently high sulfate levels that already have a suitable filtration treatment train in place.

<sup>g</sup> This technology is most applicable to small systems that already have filtration in place.

<sup>h</sup> Handling of chemicals required during regeneration and pH adjustment may be too difficult for small systems without an adequately trained operator.

<sup>i</sup> Assumes modification to a coagulation/filtration process already in place.

Unit technologies	Limitations (see footnotes)	Operator skill level required <sup>1</sup>	Raw water quality range and considerations. <sup>1</sup>
3. Reverse osmosis (RO)	( <sup>c</sup> )	Advanced	Surface waters usually require pre-filtration.
4. POU <sup>2</sup> RO	( <sup>b</sup> )	Basic	Surface waters usually require pre-filtration.
5. Lime softening	( <sup>d</sup> )	Advanced	All waters.
6. Green sand filtration	( <sup>e</sup> )	Basic.	
7. Co-precipitation with Barium sulfate	( <sup>f</sup> )	Intermediate to Advanced	Ground waters with suitable water quality.
8. Electrodialysis/ electrodialysis reversal		Basic to Intermediate	All ground waters.
9. Pre-formed hydrous Manganese oxide filtration	( <sup>g</sup> )	Intermediate	All ground waters.
10. Activated alumina	( <sup>a</sup> ), ( <sup>h</sup> )	Advanced	All ground waters; competing anion concentrations may affect regeneration frequency.
11. Enhanced	( <sup>i</sup> )	Advanced	Can treat a wide range of water qualities.

<sup>1</sup> National Research Council (NRC). *Safe Water from Every Tap: Improving Water Service to Small Communities*. National Academy Press. Washington, D.C. 1997.

<sup>2</sup> A POU, or "point-of-use" technology is a treatment device installed at a single tap used for the purpose of reducing contaminants in drinking water at that one tap. POU devices are typically installed at the kitchen tap. See the April 21, 2000 NODA for more details.

Limitations Footnotes: Technologies for Radionuclides:

<sup>a</sup> The regeneration solution contains high concentrations of the contaminant ions. Disposal options should be carefully considered before choosing this technology.

<sup>b</sup> When POU devices are used for compliance, programs for long-term operation, maintenance, and monitoring must be provided by water utility to ensure proper performance.

<sup>c</sup> Reject water disposal options should be carefully considered before choosing this technology. See other RO limitations described in the SWTR Compliance Technologies Table.

<sup>d</sup> The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small surface water systems.

<sup>e</sup> Removal efficiencies can vary depending on water quality.

<sup>f</sup> This technology may be very limited in application to small systems. Since the process requires static mixing, detention basins, and filtration, it is most applicable to systems with sufficiently high sulfate levels that already have a suitable filtration treatment train in place.

<sup>g</sup> This technology is most applicable to small systems that already have filtration in place.

<sup>h</sup> Handling of chemicals required during regeneration and pH adjustment may be too difficult for small systems without an adequately trained operator.

<sup>i</sup> Assumes modification to a coagulation/filtration process already in place.

Unit technologies	Limitations (see footnotes)	Operator skill level required <sup>1</sup>	Raw water quality range and considerations. <sup>1</sup>
coagulation/filtration			

<sup>1</sup> National Research Council (NRC). *Safe Water from Every Tap: Improving Water Service to Small Communities*. National Academy Press. Washington, D.C. 1997.

<sup>2</sup> A POU, or "point-of-use" technology is a treatment device installed at a single tap used for the purpose of reducing contaminants in drinking water at that one tap. POU devices are typically installed at the kitchen tap. See the April 21, 2000 NODA for more details.

Limitations Footnotes: Technologies for Radionuclides:

<sup>a</sup> The regeneration solution contains high concentrations of the contaminant ions. Disposal options should be carefully considered before choosing this technology.

<sup>b</sup> When POU devices are used for compliance, programs for long-term operation, maintenance, and monitoring must be provided by water utility to ensure proper performance.

<sup>c</sup> Reject water disposal options should be carefully considered before choosing this technology. See other RO limitations described in the SWTR Compliance Technologies Table.

<sup>d</sup> The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small surface water systems.

<sup>e</sup> Removal efficiencies can vary depending on water quality.

<sup>f</sup> This technology may be very limited in application to small systems. Since the process requires static mixing, detention basins, and filtration, it is most applicable to systems with sufficiently high sulfate levels that already have a suitable filtration treatment train in place.

<sup>g</sup> This technology is most applicable to small systems that already have filtration in place.

<sup>h</sup> Handling of chemicals required during regeneration and pH adjustment may be too difficult for small systems without an adequately trained operator.

<sup>i</sup> Assumes modification to a coagulation/filtration process already in place.

**TABLE D—COMPLIANCE TECHNOLOGIES BY SYSTEM SIZE CATEGORY FOR  
RADIONUCLIDE NPDWR'S**

Contaminant	Compliance technologies <sup>1</sup> for system size categories (population served)		3,300-10,000
	25-500	501-3,300	
1. Combined radium-226 and radium-228	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 3, 4, 5, 6, 7, 8, 9.
2. Gross alpha particle activity	3, 4	3, 4	3, 4.
3. Beta particle activity and	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4.

**Note:**<sup>1</sup> Numbers correspond to those technologies found listed in the table C of 141.66(h).

Contaminant	Compliance technologies <sup>1</sup> for system size categories (population served)		3,300-10,000
	25-500	501-3,300	
photon activity 4. Uranium	1, 2, 4, 10, 11	1, 2, 3, 4, 5, 10, 11	1, 2, 3, 4, 5, 10, 11.

**Note:**<sup>1</sup> Numbers correspond to those technologies found listed in the table C of 141.66(h).

[65 FR 76748, Dec. 7, 2000]

## Subpart H—Filtration and Disinfection

**Source:** 54 FR 27527, June 29, 1989, unless otherwise noted.

### § 141.70 General requirements.

- (a) The requirements of this subpart H constitute national primary drinking water regulations. These regulations establish criteria under which filtration is required as a treatment technique for public water systems supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water. In addition, these regulations establish treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: *Giardia lamblia*, viruses, heterotrophic plate count bacteria, *Legionella*, and turbidity. Each public water system with a surface water source or a ground water source under the direct influence of surface water must provide treatment of that source water that complies with these treatment technique requirements. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:
  - (1) At least 99.9 percent (3-log) removal and/or inactivation of *Giardia lamblia* cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer; and
  - (2) At least 99.99 percent (4-log) removal and/or inactivation of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.
- (b) A public water system using a surface water source or a ground water source under the direct influence of surface water is considered to be in compliance with the requirements of paragraph (a) of this section if:
  - (1) It meets the requirements for avoiding filtration in § 141.71 and the disinfection requirements in § 141.72(a); or
  - (2) It meets the filtration requirements in § 141.73 and the disinfection requirements in § 141.72(b).
- (c) Each public water system using a surface water source or a ground water source under the direct influence of surface water must be operated by qualified personnel who meet the requirements specified by the State.

- (d) **Additional requirements for systems serving at least 10,000 people.** In addition to complying with requirements in this subpart, systems serving at least 10,000 people must also comply with the requirements in subpart P of this part.
- (e) **Additional requirements for systems serving fewer than 10,000 people.** In addition to complying with requirements in this subpart, systems serving fewer than 10,000 people must also comply with the requirements in subpart T of this part.

[54 FR 27527, June 29, 1989, as amended at 63 FR 69516, Dec. 16, 1998; 67 FR 1836, Jan. 14, 2002]

## § 141.71 Criteria for avoiding filtration.

A public water system that uses a surface water source must meet all of the conditions of paragraphs (a) and (b) of this section, and is subject to paragraph (c) of this section, beginning December 30, 1991, unless the State has determined, in writing pursuant to § 1412(b)(7)(C)(iii), that filtration is required. A public water system that uses a ground water source under the direct influence of surface water must meet all of the conditions of paragraphs (a) and (b) of this section and is subject to paragraph (c) of this section, beginning 18 months after the State determines that it is under the direct influence of surface water, or December 30, 1991, whichever is later, unless the State has determined, in writing pursuant to § 1412(b)(7)(C)(iii), that filtration is required. If the State determines in writing pursuant to § 1412(b)(7)(C)(iii) before December 30, 1991, that filtration is required, the system must have installed filtration and meet the criteria for filtered systems specified in §§ 141.72(b) and 141.73 by June 29, 1993. Within 18 months of the failure of a system using surface water or a ground water source under the direct influence of surface water to meet any one of the requirements of paragraphs (a) and (b) of this section or after June 29, 1993, whichever is later, the system must have installed filtration and meet the criteria for filtered systems specified in §§ 141.72(b) and 141.73.

### (a) **Source water quality conditions.**

- (1) The fecal coliform concentration must be equal to or less than 20/100 ml, or the total coliform concentration must be equal to or less than 100/100 ml (measured as specified in § 141.74 (a) (1) and (2) and (b)(1)), in representative samples of the source water immediately prior to the first or only point of disinfectant application in at least 90 percent of the measurements made for the 6 previous months that the system served water to the public on an ongoing basis. If a system measures both fecal and total coliforms, the fecal coliform criterion, but not the total coliform criterion, in this paragraph must be met.
- (2) The turbidity level cannot exceed 5 NTU (measured as specified in § 141.74 (a)(1) and (b)(2)) in representative samples of the source water immediately prior to the first or only point of disinfectant application unless:
  - (i) the State determines that any such event was caused by circumstances that were unusual and unpredictable; and
  - (ii) as a result of any such event, there have not been more than two events in the past 12 months the system served water to the public, or more than five events in the past 120 months the system served water to the public, in which the turbidity level exceeded 5 NTU. An "event" is a series of consecutive days during which at least one turbidity measurement each day exceeds 5 NTU.

### (b) **Site-specific conditions.**

(1)

- (i) The public water system must meet the requirements of § 141.72(a)(1) at least 11 of the 12 previous months that the system served water to the public, on an ongoing basis, unless the system fails to meet the requirements during 2 of the 12 previous months that the system served water to the public, and the State determines that at least one of these failures was caused by circumstances that were unusual and unpredictable.
- (ii) The public water system must meet the requirements of § 141.72(a)(2) at all times the system serves water to the public.
- (iii) The public water system must meet the requirements of § 141.72(a)(3) at all times the system serves water to the public unless the State determines that any such failure was caused by circumstances that were unusual and unpredictable.
- (iv) The public water system must meet the requirements of § 141.72(a)(4) on an ongoing basis unless the State determines that failure to meet these requirements was not caused by a deficiency in treatment of the source water.

(2) The public water system must maintain a watershed control program which minimizes the potential for contamination by *Giardia lamblia* cysts and viruses in the source water. The State must determine whether the watershed control program is adequate to meet this goal. The adequacy of a program to limit potential contamination by *Giardia lamblia* cysts and viruses must be based on: the comprehensiveness of the watershed review; the effectiveness of the system's program to monitor and control detrimental activities occurring in the watershed; and the extent to which the water system has maximized land ownership and/or controlled land use within the watershed. At a minimum, the watershed control program must:

- (i) Characterize the watershed hydrology and land ownership;
- (ii) Identify watershed characteristics and activities which may have an adverse effect on source water quality; and
- (iii) Monitor the occurrence of activities which may have an adverse effect on source water quality.

The public water system must demonstrate through ownership and/or written agreements with landowners within the watershed that it can control all human activities which may have an adverse impact on the microbiological quality of the source water. The public water system must submit an annual report to the State that identifies any special concerns about the watershed and how they are being handled; describes activities in the watershed that affect water quality; and projects what adverse activities are expected to occur in the future and describes how the public water system expects to address them. For systems using a ground water source under the direct influence of surface water, an approved wellhead protection program developed under section 1428 of the Safe Drinking Water Act may be used, if the State deems it appropriate, to meet these requirements.

(3) The public water system must be subject to an annual on-site inspection to assess the watershed control program and disinfection treatment process. Either the State or a party approved by the State must conduct the on-site inspection. The inspection must be conducted by competent individuals such as sanitary and civil engineers, sanitarians, or technicians who have experience and knowledge about the operation and maintenance of a public water system, and who have a sound understanding of public health principles and waterborne diseases. A report of the on-site inspection

summarizing all findings must be prepared every year. The on-site inspection must indicate to the State's satisfaction that the watershed control program and disinfection treatment process are adequately designed and maintained. The on-site inspection must include:

- (i) A review of the effectiveness of the watershed control program;
  - (ii) A review of the physical condition of the source intake and how well it is protected;
  - (iii) A review of the system's equipment maintenance program to ensure there is low probability for failure of the disinfection process;
  - (iv) An inspection of the disinfection equipment for physical deterioration;
  - (v) A review of operating procedures;
  - (vi) A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced; and
  - (vii) Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection.
- (4) The public water system must not have been identified as a source of a waterborne disease outbreak, or if it has been so identified, the system must have been modified sufficiently to prevent another such occurrence, as determined by the State.
- (5) The public water system must comply with the maximum contaminant level (MCL) for total coliforms in § 141.63(a) and (b) and the MCL for *E. coli* in § 141.63(c) at least 11 months of the 12 previous months that the system served water to the public, on an ongoing basis, unless the State determines that failure to meet this requirement was not caused by a deficiency in treatment of the source water.
- (6) The public water system must comply with the requirements for trihalomethanes in §§ 141.12 and 141.30 until December 31, 2001. After December 31, 2001, the system must comply with the requirements for total trihalomethanes, haloacetic acids (five), bromate, chlorite, chlorine, chloramines, and chlorine dioxide in subpart L of this part.

(c) **Treatment technique violations.**

- (1) A system that
- (i) fails to meet any one of the criteria in paragraphs (a) and (b) of this section and/or which the State has determined that filtration is required, in writing pursuant to § 141.2(b)(7)(C)(iii), and
  - (ii) fails to install filtration by the date specified in the introductory paragraph of this section is in violation of a treatment technique requirement.
- (2) A system that has not installed filtration is in violation of a treatment technique requirement if:
- (i) The turbidity level (measured as specified in § 141.74(a)(1) and (b)(2)) in a representative sample of the source water immediately prior to the first or only point of disinfection application exceeds 5 NTU; or
  - (ii) The system is identified as a source of a waterborne disease outbreak.

[54 FR 27527, June 29, 1989, as amended at 63 FR 69516, Dec. 16, 1998; 66 FR 3776, Jan. 16, 2001; 69 FR 38855, June 29, 2004; 78 FR 10347, Feb. 13, 2013]



## § 141.72 Disinfection.

A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, unless the State determines that filtration is required in writing pursuant to § 141.74(b)(7)(C)(iii). A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, or 18 months after the State determines that the ground water source is under the influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to § 141.74(b)(7)(C)(iii). If the State has determined that filtration is required, the system must comply with any interim disinfection requirements the State deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in paragraph (b) of this section beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A system that uses a ground water source under the direct influence of surface water and provides filtration treatment must provide disinfection treatment as specified in paragraph (b) of this section by June 29, 1993, or beginning when filtration is installed, whichever is later. Failure to meet any requirement of this section after the applicable date specified in this introductory paragraph is a treatment technique violation.

- (a) **Disinfection requirements for public water systems that do not provide filtration.** Each public water system that does not provide filtration treatment must provide disinfection treatment as follows:
- (1) The disinfection treatment must be sufficient to ensure at least 99.9 percent (3-log) inactivation of *Giardia lamblia* cysts and 99.99 percent (4-log) inactivation of viruses, every day the system serves water to the public, except any one day each month. Each day a system serves water to the public, the public water system must calculate the CT value(s) from the system's treatment parameters, using the procedure specified in § 141.74(b)(3), and determine whether this value(s) is sufficient to achieve the specified inactivation rates for *Giardia lamblia* cysts and viruses. If a system uses a disinfectant other than chlorine, the system may demonstrate to the State, through the use of a State-approved protocol for on-site disinfection challenge studies or other information satisfactory to the State, that CT<sub>99.9</sub> values other than those specified in tables 2.1 and 3.1 in § 141.74(b)(3) or other operational parameters are adequate to demonstrate that the system is achieving minimum inactivation rates required by paragraph (a)(1) of this section.
  - (2) The disinfection system must have either
    - (i) redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system, or
    - (ii) automatic shut-off of delivery of water to the distribution system whenever there is less than 0.2 mg/l of residual disinfectant concentration in the water. If the State determines that automatic shut-off would cause unreasonable risk to health or interfere with fire protection, the system must comply with paragraph (a)(2)(i) of this section.
  - (3) The residual disinfectant concentration in the water entering the distribution system, measured as specified in § 141.74 (a)(2) and (b)(5), cannot be less than 0.2 mg/l for more than 4 hours.
  - (4)

- (i) The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in § 141.74 (a)(2) and (b)(6), cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in § 141.74(a)(1), is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 percent in one month, for any two consecutive months.

$$V = \frac{c + d + e}{a + b} \times 100$$

where:

a = number of instances where the residual disinfectant concentration is measured;

b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d = number of instances where the residual disinfectant concentration is measured but not detected and where the HPC is >500/ml; and

e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

- (ii) If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by § 141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (a)(4)(i) of this section do not apply to that system.

- (b) **Disinfection requirements for public water systems which provide filtration.** Each public water system that provides filtration treatment must provide disinfection treatment as follows.

- (1) The disinfection treatment must be sufficient to ensure that the total treatment processes of that system achieve at least 99.9 percent (3-log) inactivation and/or removal of *Giardia lamblia* cysts and at least 99.99 percent (4-log) inactivation and/or removal of viruses, as determined by the State.

- (2) The residual disinfectant concentration in the water entering the distribution system, measured as specified in § 141.74 (a)(2) and (c)(2), cannot be less than 0.2 mg/l for more than 4 hours.

(3)

- (i) The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in § 141.74 (a)(2) and (c)(3), cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic

plate count (HPC) as specified in § 141.74(a)(1), is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 percent in one month, for any two consecutive months.

$$V = \frac{c + d + e}{a + b} \times 100$$

where:

a = number of instances where the residual disinfectant concentration is measured;

b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d = number of instances where no residual disinfectant concentration is detected and where the HPC is >500/ml; and

e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

- (ii) If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified in § 141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(3)(i) of this section do not apply.

[54 FR 27527, June 29, 1989, as amended at 69 FR 38855, June 29, 2004]

### § 141.73 Filtration.

A public water system that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in § 141.71 (a) and (b) for avoiding filtration, must provide treatment consisting of both disinfection, as specified in § 141.72(b), and filtration treatment which complies with the requirements of paragraph (a), (b), (c), (d), or (e) of this section by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration in § 141.71 (a) and (b), whichever is later. Failure to meet any requirement of this section after the date specified in this introductory paragraph is a treatment technique violation.

(a) **Conventional filtration treatment or direct filtration.**

- (1) For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.5 NTU in at least 95 percent of the measurements taken each month, measured as specified in § 141.74 (a)(1) and (c)(1), except that if the State determines that the system is capable of achieving at least 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts at some turbidity level higher than 0.5 NTU in at least 95 percent of the measurements taken each month, the State may substitute this higher turbidity limit

for that system. However, in no case may the State approve a turbidity limit that allows more than 1 NTU in more than 5 percent of the samples taken each month, measured as specified in § 141.74 (a)(1) and (c)(1).

- (2) The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in § 141.74 (a)(1) and (c)(1).
- (3) Beginning January 1, 2002, systems serving at least 10,000 people must meet the turbidity requirements in § 141.173(a).
- (4) Beginning January 1, 2005, systems serving fewer than 10,000 people must meet the turbidity requirements in §§ 141.550 through 141.553.

(b) ***Slow sand filtration.***

- (1) For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in § 141.74 (a)(1) and (c)(1), except that if the State determines there is no significant interference with disinfection at a higher turbidity level, the State may substitute this higher turbidity limit for that system.
- (2) The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in § 141.74 (a)(1) and (c)(1).

(c) ***Diatomaceous earth filtration.***

- (1) For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in § 141.74 (a)(1) and (c)(1).
- (2) The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in § 141.74 (a)(1) and (c)(1).

- (d) ***Other filtration technologies.*** A public water system may use a filtration technology not listed in paragraphs (a) through (c) of this section if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of § 141.72(b), consistently achieves 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts and 99.99 percent removal and/or inactivation of viruses. For a system that makes this demonstration, the requirements of paragraph (b) of this section apply. Beginning January 1, 2002, systems serving at least 10,000 people must meet the requirements for other filtration technologies in § 141.173(b). Beginning January 14, 2005, systems serving fewer than 10,000 people must meet the requirements for other filtration technologies in § 141.550 through 141.553.

[54 FR 27527, June 29, 1989, as amended at 63 FR 69516, Dec. 16, 1998; 66 FR 3776, Jan. 16, 2001; 67 FR 1836, Jan. 14, 2002; 69 FR 38855, June 29, 2004]

## § 141.74 Analytical and monitoring requirements.

- (a) ***Analytical requirements.*** Only the analytical method(s) specified in this paragraph, or otherwise approved by EPA, may be used to demonstrate compliance with §§ 141.71, 141.72 and 141.73. Measurements for pH, turbidity, temperature and residual disinfectant concentrations must be conducted by a person approved by the State. Measurement for total coliforms, fecal coliforms and HPC must be conducted by a laboratory certified by the State or EPA to do such analysis. Until laboratory certification criteria are

developed for the analysis of fecal coliforms and HPC, any laboratory certified for total coliforms analysis by the State or EPA is deemed certified for fecal coliforms and HPC analysis. The following procedures shall be conducted in accordance with the publications listed in the following section. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the methods published in *Standard Methods for the Examination of Water and Wastewater* may be obtained from the American Public Health Association et al., 1015 Fifteenth Street, NW., Washington, DC 20005; copies of the Minimal Medium ONPG-MUG Method as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg et al.), *Applied and Environmental Microbiology*, Volume 54, pp. 1595-1601, June 1988 (as amended under Erratum, *Applied and Environmental Microbiology*, Volume 54, p. 3197, December, 1988), may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, Colorado, 80235; and copies of the Indigo Method as set forth in the article "Determination of Ozone in Water by the Indigo Method" (Bader and Hoigne), may be obtained from Ozone Science & Engineering, Pergamon Press Ltd., Fairview Park, Elmsford, New York 10523. Copies may be inspected at the U.S. Environmental Protection Agency, Room EB15, 401 M St., SW., Washington, DC 20460 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

- (1) Public water systems must conduct analysis of pH and temperature in accordance with one of the methods listed at § 141.23(k)(1). Public water systems must conduct analysis of total coliforms, fecal coliforms, heterotrophic bacteria, and turbidity in accordance with one of the following analytical methods or one of the alternative methods listed in appendix A to subpart C of this part and by using analytical test procedures contained in *Technical Notes on Drinking Water Methods*,

EPA-600/R-94-173, October 1994. This document is available from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242-0419 or <http://www.epa.gov/nscep/>.

Organism	Methodology	Citation <sup>1</sup>
Total Coliform <sup>2</sup>	Total Coliform Fermentation Technique <sup>3 4 5</sup>	9221 A, B, C
	Total Coliform Membrane Filter Technique <sup>6</sup>	9222 A, B, C
	ONPG-MUG Test <sup>7</sup>	9223
Fecal Coliforms <sup>2</sup>	Fecal Coliform Procedure <sup>8</sup>	9221 E
	Fecal Coliform Filter Procedure	9222 D
Heterotrophic bacteria <sup>2</sup>	Pour Plate Method	9215 B
	SimPlate <sup>11</sup>	
Turbidity <sup>13</sup>	Nephelometric Method	2130 B
	Nephelometric Method	180.1 <sup>9</sup>
	Great Lakes Instruments	Method 2 <sup>10</sup>
	Hach FilterTrak	10133 <sup>12</sup>

*The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1, 6, 7 and 9-12 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800-426-4791. Documents may be inspected at EPA's Drinking Water Docket, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington DC 20460 (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).*

<sup>1</sup> Except where noted, all methods refer to Standard Methods for the Examination of Water and Wastewater, 18th edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005. The cited methods published in any of these three editions may be used. In addition, the following online versions may also be used: 2130 B-01, 9215 B-00, 9221 A, B, C, E-99, 9222 A, B, C, D-97, and 9223 B-97. Standard Methods Online are available at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only Online versions that may be used.

<sup>2</sup> The time from sample collection to initiation of analysis may not exceed 8 hours. Systems must hold samples below 10 deg. C during transit.

<sup>3</sup> Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between this medium and lauryl tryptose broth using the water normally tested, and this comparison demonstrates that the false-positive rate and false-negative rate for total coliform, using lactose broth, is less than 10 percent.

<sup>4</sup> Media should cover inverted tubes at least one-half to two-thirds after the sample is added.

<sup>5</sup> No requirement exists to run the completed phase on 10 percent of all total coliform-positive confirmed tubes.

<sup>6</sup> MI agar also may be used. Preparation and use of MI agar is set forth in the article, "New medium for the simultaneous detection of total coliform and *Escherichia coli* in water" by Brenner, K.P., et. al., 1993, *Appl. Environ. Microbiol.* 59:3534-3544. Also available from the Office of Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington DC 20460, EPA/600/J-99/225. Verification of colonies is not required.

<sup>7</sup> The ONPG-MUG Test is also known as the Autoanalysis Colilert System.

<sup>8</sup> A-1 broth may be held up to 7 days in a tightly closed screw cap tube at 4 °C.

<sup>9</sup> "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA/600/R-93/100, August 1993. Available at NTIS, PB94-121811.

<sup>10</sup> GLI Method 2, "Turbidity," November 2, 1992, Great Lakes Instruments, Inc., 8855 North 55th Street, Milwaukee, WI 53223.

<sup>11</sup> A description of the SimPlate method, "IDEXX SimPlate TM HPC Test Method for Heterotrophs in Water," November 2000, can be obtained from IDEXX Laboratories, Inc., 1 IDEXX Drive, Westbrook, ME 04092, telephone (800) 321-0207.

<sup>12</sup> A description of the Hach FilterTrak Method 10133, "Determination of Turbidity by Laser Nephelometry," January 2000, Revision 2.0, can be obtained from; Hach Co., P.O. Box 389, Loveland, CO 80539-0389, telephone: 800-227-4224.

<sup>13</sup> Styrene divinyl benzene beads (e.g., AMCO-AEPA-1 or equivalent) and stabilized formazin (e.g., Hach StablCal™ or equivalent) are acceptable substitutes for formazin.

- (2) Public water systems must measure residual disinfectant concentrations with one of the analytical methods in the following table or one of the alternative methods listed in appendix A to subpart C of this part. If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine also may be measured by using DPD colorimetric test kits. In addition States may approve the use of the ITS free chlorine test strip for the determination of free chlorine. Use of the test strips is described in Method D99-003, "Free Chlorine Species (HOCl<sup>-</sup> and OCl<sup>-</sup>) by Test Strip," Revision 3.0, November 21, 2003, available from Industrial Test Systems, Inc., 1875 Langston St., Rock Hill, SC 29730. Free and total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument provided the



chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five days, or with a protocol approved by the State.

Residual	Methodology	SM <sup>1</sup>	SM Online <sup>2</sup>	Other
Free Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D-00	D1253-03 <sup>3</sup>
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F-00	
	DPD Colorimetric	4500-Cl G	4500-Cl G-00	
	Syringaldazine (FACTS)	4500-Cl H	4500-Cl H-00	
Total Chlorine	Amperometric Titration	4500-Cl D	4500-Cl D-00	D1253-03 <sup>3</sup>
	Amperometric Titration (low level measurement)	4500-Cl E	4500-Cl E-00	
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F-00	
	DPD Colorimetric	4500-Cl G	4500-Cl G-00	
Chlorine Dioxide	Iodometric Electrode	4500-Cl I	4500-Cl I-00	
	Amperometric Titration	4500-ClO <sub>2</sub> C	4500-ClO <sub>2</sub> C-00	
	DPD Method	4500-ClO <sub>2</sub> D		
	Amperometric Titration	4500-ClO <sub>2</sub> E	4500-ClO <sub>2</sub> E-00	
	Spectrophotometric			
				327.0, Revision 1.1 <sup>4</sup>

<sup>1</sup> All the listed methods are contained in the 18th, 19th, and 20th editions of *Standard Methods for the Examination of Water and Wastewater*, 1992, 1995, and 1998; the cited methods published in any of these three editions may be used.

<sup>2</sup> *Standard Methods Online* are available at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only Online versions that may be used.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol. 11.01, 2004 ; ASTM International; any year containing the cited version of the method may be used. Copies of this method may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700 West Conshohocken, PA 19428-2959.

<sup>4</sup> EPA Method 327.0, Revision 1.1, "Determination of Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry," USEPA, May 2005, EPA 815-R-05-008. Available online at <http://www.epa.gov/safewater/methods/sourcalt.html>.

Residual	Methodology	SM <sup>1</sup>	SM Online <sup>2</sup>	Other
Ozone	Indigo Method	4500-O <sub>3</sub> B	4500-O <sub>3</sub> B-97	

<sup>1</sup> All the listed methods are contained in the 18th, 19th, and 20th editions of Standard Methods for the Examination of Water and Wastewater, 1992, 1995, and 1998; the cited methods published in any of these three editions may be used.

<sup>2</sup> Standard Methods Online are available at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only Online versions that may be used.

<sup>3</sup> Annual Book of ASTM Standards, Vol. 11.01, 2004; ASTM International; any year containing the cited version of the method may be used. Copies of this method may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700 West Conshohocken, PA 19428-2959.

<sup>4</sup> EPA Method 327.0, Revision 1.1, "Determination of Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry," USEPA, May 2005, EPA 815-R-05-008. Available online at <http://www.epa.gov/safewater/methods/sourcalt.html>.

(b) **Monitoring requirements for systems that do not provide filtration.** A public water system that uses a surface water source and does not provide filtration treatment must begin monitoring, as specified in this paragraph (b), beginning December 31, 1990, unless the State has determined that filtration is required in writing pursuant to § 1412(b)(7)(C)(iii), in which case the State may specify alternative monitoring requirements, as appropriate, until filtration is in place. A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must begin monitoring as specified in this paragraph (b) beginning December 31, 1990, or 6 months after the State determines that the ground water source is under the direct influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to § 1412(b)(7)(C)(iii), in which case the State may specify alternative monitoring requirements, as appropriate, until filtration is in place.

- (1) Fecal coliform or total coliform density measurements as required by § 141.71(a)(1) must be performed on representative source water samples immediately prior to the first or only point of disinfectant application. The system must sample for fecal or total coliforms at the following minimum frequency each week the system serves water to the public:

System size (persons served)	Samples/week <sup>1</sup>
≤500	1
501 to 3,300	2
3,301 to 10,000	3
10,001 to 25,000	4

<sup>1</sup> Must be taken on separate days.

System size (persons served)	Samples/week <sup>1</sup>
>25,000	5

<sup>1</sup> Must be taken on separate days.

Also, one fecal or total coliform density measurement must be made every day the system serves water to the public and the turbidity of the source water exceeds 1 NTU (these samples count towards the weekly coliform sampling requirement) unless the State determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection.

- (2) Turbidity measurements as required by § 141.71(a)(2) must be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State.
- (3) The total inactivation ratio for each day that the system is in operation must be determined based on the CT<sub>99,9</sub> values in tables 1.1-1.6, 2.1, and 3.1 of this section, as appropriate. The parameters necessary to determine the total inactivation ratio must be monitored as follows:
  - (i) The temperature of the disinfected water must be measured at least once per day at each residual disinfectant concentration sampling point.
  - (ii) If the system uses chlorine, the pH of the disinfected water must be measured at least once per day at each chlorine residual disinfectant concentration sampling point.
  - (iii) The disinfectant contact time(s) ("T") must be determined for each day during peak hourly flow.
  - (iv) The residual disinfectant concentration(s) ("C") of the water before or at the first customer must be measured each day during peak hourly flow.
  - (v) If a system uses a disinfectant other than chlorine, the system may demonstrate to the State, through the use of a State-approved protocol for on-site disinfection challenge studies or other information satisfactory to the State, that CT<sub>99,9</sub> values other than those specified in tables 2.1 and 3.1 in this section other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by § 141.72(a)(1).

TABLE 1.1—CT VALUES (CT<sub>99.9</sub>) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 0.5 °C OR LOWER<sup>1</sup>

Residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	137	163	195	237	277	329	390
0.6	141	168	200	239	286	342	407
0.8	145	172	205	246	295	354	422
1.0	148	176	210	253	304	365	437
1.2	152	180	215	259	313	376	451
1.4	155	184	221	266	321	387	464
1.6	157	189	226	273	329	397	477
1.8	162	193	231	279	338	407	489
2.0	165	197	236	286	346	417	500
2.2	169	201	242	297	353	426	511
2.4	172	205	247	298	361	435	522
2.6	175	209	252	304	368	444	533
2.8	178	213	257	310	375	452	543
3.0	181	217	261	316	382	460	552

<sup>1</sup> These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT<sub>99.9</sub> value at the lower temperature and at the higher pH.

**TABLE 1.2—CT VALUES (CT<sub>99.9</sub>) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 5.0 °C<sup>1</sup>**

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	97	117	139	166	198	236	279
0.6	100	120	143	171	204	244	291
0.8	103	122	146	175	210	252	301
1.0	105	125	149	179	216	260	312
1.2	107	127	152	183	221	267	320
1.4	109	130	155	187	227	274	329
1.6	111	132	158	192	232	281	337
1.8	114	135	162	196	238	287	345
2.0	116	138	165	200	243	294	353
2.2	118	140	169	204	248	300	361
2.4	120	143	172	209	253	306	368
2.6	122	146	175	213	258	312	375
2.8	124	148	178	217	263	318	382
3.0	126	151	182	221	268	324	389

<sup>1</sup> These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT<sub>99.9</sub> value at the lower temperature, and at the higher pH.

**TABLE 1.3—CT VALUES (CT<sub>99.9</sub>) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 10.0 °C<sup>1</sup>**

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	73	88	104	125	149	177	209
0.6	75	90	107	128	153	183	218
0.8	78	92	110	131	158	189	226
1.0	79	94	112	134	162	195	234
1.2	80	95	114	137	166	200	240
1.4	82	98	116	140	170	206	247
1.6	83	99	119	144	174	211	253
1.8	86	101	122	147	179	215	259
2.0	87	104	124	150	182	221	265
2.2	89	105	127	153	186	225	271
2.4	90	107	129	157	190	230	276
2.6	92	110	131	160	194	234	281
2.8	93	111	134	163	197	239	287
3.0	95	113	137	166	201	243	292

<sup>1</sup> These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT<sub>99.9</sub> value at the lower temperature, and at the higher pH.

TABLE 1.4—CT VALUES (CT<sub>99.9</sub>) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 15.0 °C<sup>1</sup>

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	49	59	70	83	99	118	140
0.6	50	60	72	86	102	122	146
0.8	52	61	73	88	105	126	151
1.0	53	63	75	90	108	130	156
1.2	54	64	76	92	111	134	160
1.4	55	65	78	94	114	137	165
1.6	56	66	79	96	116	141	169
1.8	57	68	81	98	119	144	173
2.0	58	69	83	100	122	147	177
2.2	59	70	85	102	124	150	181
2.4	60	72	86	105	127	153	184
2.6	61	73	88	107	129	156	188
2.8	62	74	89	109	132	159	191
3.0	63	76	91	111	134	162	195

<sup>1</sup> These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT<sub>99.9</sub> value at the lower temperature, and at the higher pH.

TABLE 1.5—CT VALUES (CT<sub>99.9</sub>) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 20 °C<sup>1</sup>

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	36	44	52	62	74	89	105
0.6	38	45	54	64	77	92	109
0.8	39	46	55	66	79	95	113
1.0	39	47	56	67	81	98	117
1.2	40	48	57	69	83	100	120
1.4	41	49	58	70	85	103	123
1.6	42	50	59	72	87	105	126
1.8	43	51	61	74	89	108	129
2.0	44	52	62	75	91	110	132
2.2	44	53	63	77	93	113	135
2.4	45	54	65	78	95	115	138
2.6	46	55	66	80	97	117	141
2.8	47	56	67	81	99	119	143
3.0	47	57	68	83	101	122	146

<sup>1</sup> These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT<sub>99.9</sub> value at the lower temperature, and at the higher pH.



**TABLE 1.6—CT VALUES (CT<sub>99.9</sub>) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 25 °C<sup>1</sup> AND HIGHER**

Free residual (mg/l)	pH						
	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
≤0.4	24	29	35	42	50	59	70
0.6	25	30	36	43	51	61	73
0.8	26	31	37	44	53	63	75
1.0	26	31	37	45	54	65	78
1.2	27	32	38	46	55	67	80
1.4	27	33	39	47	57	69	82
1.6	28	33	40	48	58	70	84
1.8	29	34	41	49	60	72	86
2.0	29	35	41	50	61	74	88
2.2	30	35	42	51	62	75	90
2.4	30	36	43	52	63	77	92
2.6	31	37	44	53	65	78	94
2.8	31	37	45	54	66	80	96
3.0	32	38	46	55	67	81	97

<sup>1</sup> These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT<sub>99.9</sub> value at the lower temperature, and at the higher pH.

**TABLE 2.1—CT VALUES (CT<sub>99.9</sub>) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORINE DIOXIDE AND OZONE<sup>1</sup>**

	Temperature					
	<1 °C	5 °C	10 °C	15 °C	20 °C	≥25 °C
Chlorine dioxide	63	26	23	19	15	11
Ozone	2.9	1.9	1.4	0.95	0.72	0.48

<sup>1</sup> These CT values achieve greater than 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the CT<sub>99.9</sub> value at the lower temperature for determining CT<sub>99.9</sub> values between indicated temperatures.

**TABLE 3.1—CT VALUES (CT<sub>99.9</sub>) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORAMINES<sup>1</sup>**

Temperature					
<1 °C	5 °C	10 °C	15 °C	20 °C	25 °C
3,800	2,200	1,850	1,500	1,100	750

<sup>1</sup> These values are for pH values of 6 to 9. These CT values may be assumed to achieve greater than 99.99 percent inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia. If this condition is not met, the system must demonstrate, based on on-site studies or other information, as approved by the State, that the system is achieving at least 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the CT<sub>99.9</sub> value at the lower temperature for determining CT<sub>99.9</sub> values between indicated temperatures.

(4) The total inactivation ratio must be calculated as follows:

- (i) If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio based on either of the following two methods:
  - (A) One inactivation ratio (CT<sub>calc</sub>/CT<sub>99.9</sub>) is determined before or at the first customer during peak hourly flow and if the CT<sub>calc</sub>/CT<sub>99.9</sub> ≥ 1.0, the 99.9 percent *Giardia lamblia* inactivation requirement has been achieved; or
  - (B) Successive CT<sub>calc</sub>/CT<sub>99.9</sub> values, representing sequential inactivation ratios, are determined between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the following method must be used to calculate the total inactivation ratio:

- (1) Determine  $\frac{CT_{calc}}{CT_{99.9}}$  for each sequence.
- (2) Add the  $\frac{CT_{calc}}{CT_{99.9}}$  values together  $\left( \sum \frac{CT_{calc}}{CT_{99.9}} \right)$
- (3) If  $\sum \left( \frac{CT_{calc}}{CT_{99.9}} \right) \geq 1.0$ , the 99.9 percent *Giardia*

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*lamblia* inactivation requirement has been achieved.

- (ii) If the system uses more than one point of disinfectant application before or at the first customer, the system must determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak hourly flow. The  $CT_{calc}/CT_{99.9}$  value of each sequence and

$$\sum \frac{CT_{calc}}{CT_{99.9}}$$

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must be calculated using the method in paragraph (b)(4)(i)(B) of this section to determine if the system is in compliance with § 141.72(a).

- (iii) Although not required, the total percent inactivation for a system with one or more points of residual disinfectant concentration monitoring may be calculated by solving the following equation:

$$\text{Percent inactivation} = 100 - \frac{100}{10^z}$$

$$\text{where } z = 3 \times \sum \left( \frac{CT_{calc}}{CT_{99.9}} \right)$$

- 
- (5) The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in

lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies prescribed below:

System size by population	Samples/day <sup>1</sup>
<500	1
501 to 1,000	2
1,001 to 2,500	3
2,501 to 3,300	4

<sup>1</sup> The day's samples cannot be taken at the same time. The sampling intervals are subject to State review and approval.

If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual concentration is equal to or greater than 0.2 mg/l.

(6)

- (i) Until March 31, 2016, the residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in § 141.21. Beginning April 1, 2016, the residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in §§ 141.854 through 141.858. The State may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source, to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in paragraph (a)(1) of this section, may be measured in lieu of residual disinfectant concentration.
- (ii) If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by paragraph (a)(1) of this section and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(6)(i) of this section do not apply to that system.

(c) **Monitoring requirements for systems using filtration treatment.** A public water system that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment must monitor in accordance with this paragraph (c) beginning June 29, 1993, or when filtration is installed, whichever is later.

- (1) Turbidity measurements as required by § 141.73 must be performed on representative samples of the system's filtered water every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State. For any systems using slow sand filtration or filtration treatment

other than conventional treatment, direct filtration, or diatomaceous earth filtration, the State may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. For systems serving 500 or fewer persons, the State may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the State determines that less frequent monitoring is sufficient to indicate effective filtration performance.

- (2) The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:

System size by population	Samples/day <sup>1</sup>
±500	1
501 to 1,000	2
1,001 to 2,500	3
2,501 to 3,300	4

<sup>1</sup> The day's samples cannot be taken at the same time. The sampling intervals are subject to State review and approval.

If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/l.

- (3)
- (i) Until March 31, 2016, the residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in § 141.21. Beginning April 1, 2016, the residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in §§ 141.854 through 141.858. The State may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source, to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in paragraph (a)(1) of this section, may be measured in lieu of residual disinfectant concentration.
- (ii) If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by paragraph (a)(1) of this section and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (c)(3)(i) of this section do not apply to that system.

[54 FR 27527, June 29, 1989, as amended at 59 FR 62470, Dec. 5, 1994; 60 FR 34086, June 29, 1995; 64 FR 67465, Dec. 1, 1999; 67 FR 65252, Oct. 23, 2002; 67 FR 65901, Oct. 29, 2002; 69 FR 38856, June 29, 2004; 72 FR 11247, Mar. 12, 2007; 74 FR 30958, June 29, 2009; 78 FR 10347, Feb. 13, 2013]

## § 141.75 Reporting and recordkeeping requirements.

- (a) A public water system that uses a surface water source and does not provide filtration treatment must report monthly to the State the information specified in this paragraph (a) beginning December 31, 1990, unless the State has determined that filtration is required in writing pursuant to section 1412(b)(7)(C)(iii), in which case the State may specify alternative reporting requirements, as appropriate, until filtration is in place. A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must report monthly to the State the information specified in this paragraph (a) beginning December 31, 1990, or 6 months after the State determines that the ground water source is under the direct influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to § 1412(b)(7)(C)(iii), in which case the State may specify alternative reporting requirements, as appropriate, until filtration is in place.
- (1) Source water quality information must be reported to the State within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:
  - (i) The cumulative number of months for which results are reported.
  - (ii) The number of fecal and/or total coliform samples, whichever are analyzed during the month (if a system monitors for both, only fecal coliforms must be reported), the dates of sample collection, and the dates when the turbidity level exceeded 1 NTU.
  - (iii) The number of samples during the month that had equal to or less than 20/100 ml fecal coliforms and/or equal to or less than 100/100 ml total coliforms, whichever are analyzed.
  - (iv) The cumulative number of fecal or total coliform samples, whichever are analyzed, during the previous six months the system served water to the public.
  - (v) The cumulative number of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed, during the previous six months the system served water to the public.
  - (vi) The percentage of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed, during the previous six months the system served water to the public.
  - (vii) The maximum turbidity level measured during the month, the date(s) of occurrence for any measurement(s) which exceeded 5 NTU, and the date(s) the occurrence(s) was reported to the State.
  - (viii) For the first 12 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after one year of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 12 months the system served water to the public.
  - (ix) For the first 120 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after 10 years of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 120 months the system served water to the public.

- (2) Disinfection information specified in § 141.74(b) must be reported to the State within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:
- (i) For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.
  - (ii) The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the State was notified of the occurrence.
  - (iii) The daily residual disinfectant concentration(s) (in mg/l) and disinfectant contact time(s) (in minutes) used for calculating the CT value(s).
  - (iv) If chlorine is used, the daily measurement(s) of pH of disinfected water following each point of chlorine disinfection.
  - (v) The daily measurement(s) of water temperature in °C following each point of disinfection.
  - (vi) The daily CT<sub>calc</sub> and CT<sub>calc</sub>/CT<sub>99.9</sub> values for each disinfectant measurement or sequence and the sum of all CT<sub>calc</sub>/CT<sub>99.9</sub> values ((CT<sub>calc</sub>/CT<sub>99.9</sub>)) before or at the first customer.
  - (vii) The daily determination of whether disinfection achieves adequate *Giardia* cyst and virus inactivation, *i.e.*, whether (CT<sub>calc</sub>/CT<sub>99.9</sub>) is at least 1.0 or, where disinfectants other than chlorine are used, other indicator conditions that the State determines are appropriate, are met.
  - (viii) The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to § 141.72:
    - (A) Number of instances where the residual disinfectant concentration is measured;
    - (B) Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
    - (C) Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;
    - (D) Number of instances where the residual disinfectant concentration is detected and where HPC is >500/ml;
    - (E) Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml;
    - (F) For the current and previous month the system served water to the public, the value of "V" in the following formula:

$$V = \frac{c + d + e}{a + b} \times 100$$

where:

a = the value in paragraph (a)(2)(viii)(A) of this section,

b = the value in paragraph (a)(2)(viii)(B) of this section,

c = the value in paragraph (a)(2)(viii)(C) of this section,

d = the value in paragraph (a)(2)(viii)(D) of this section, and

e = the value in paragraph (a)(2)(viii)(E) of this section.

(G) If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by § 141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (a)(2)(viii) (A)-(F) of this section do not apply to that system.

(ix) A system need not report the data listed in paragraphs (a)(2) (i), and (iii)-(vi) of this section if all data listed in paragraphs (a)(2) (i)-(viii) of this section remain on file at the system, and the State determines that:

(A) The system has submitted to the State all the information required by paragraphs (a)(2) (i)-(viii) of this section for at least 12 months; and

(B) The State has determined that the system is not required to provide filtration treatment.

(3) No later than ten days after the end of each Federal fiscal year (September 30), each system must provide to the State a report which summarizes its compliance with all watershed control program requirements specified in § 141.71(b)(2).

(4) No later than ten days after the end of each Federal fiscal year (September 30), each system must provide to the State a report on the on-site inspection conducted during that year pursuant to § 141.71(b)(3), unless the on-site inspection was conducted by the State. If the inspection was conducted by the State, the State must provide a copy of its report to the public water system.

(5)

(i) Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, must report that occurrence to the State as soon as possible, but no later than by the end of the next business day.

(ii) If at any time the turbidity exceeds 5 NTU, the system must consult with the primacy agency as soon as practical, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under § 141.203(b)(3).

(iii) If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system must notify the State as soon as possible, but no later than by the end of the next business day. The system also must notify the State by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.

(b) A public water system that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment must report monthly to the State the information specified in this paragraph (b) beginning June 29, 1993, or when filtration is installed, whichever is later.

(1) Turbidity measurements as required by § 141.74(c)(1) must be reported within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:



- (i) The total number of filtered water turbidity measurements taken during the month.
  - (ii) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in § 141.73 for the filtration technology being used.
  - (iii) The date and value of any turbidity measurements taken during the month which exceed 5 NTU.
- (2) Disinfection information specified in § 141.74(c) must be reported to the State within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:
- (i) For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.
  - (ii) The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the State was notified of the occurrence.
  - (iii) The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to § 141.72:
    - (A) Number of instances where the residual disinfectant concentration is measured;
    - (B) Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
    - (C) Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;
    - (D) Number of instances where no residual disinfectant concentration is detected and where HPC is >500/ml;
    - (E) Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml;
    - (F) For the current and previous month the system serves water to the public, the value of "V" in the following formula:

$$V = \frac{c+d+e}{a+b} \times 100$$

where:

a = the value in paragraph (b)(2)(iii)(A) of this section,

b = the value in paragraph (b)(2)(iii)(B) of this section,

c = the value in paragraph (b)(2)(iii)(C) of this section,

d = the value in paragraph (b)(2)(iii)(D) of this section, and

e = the value in paragraph (b)(2)(iii)(E) of this section.

- (G) If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory within the requisite time and temperature conditions specified by § 141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(2)(iii) (A)-(F) of this section do not apply.
  - (iv) A system need not report the data listed in paragraph (b)(2)(i) of this section if all data listed in paragraphs (b)(2) (i)-(iii) of this section remain on file at the system and the State determines that the system has submitted all the information required by paragraphs (b)(2) (i)-(iii) of this section for at least 12 months.
- (3)
- (i) Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, must report that occurrence to the State as soon as possible, but no later than by the end of the next business day.
  - (ii) If at any time the turbidity exceeds 5 NTU, the system must consult with the primacy agency as soon as practical, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under § 141.203(b)(3).
  - (iii) If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system must notify the State as soon as possible, but no later than by the end of the next business day. The system also must notify the State by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.

[54 FR 27527, June 29, 1989, as amended at 65 FR 26022, May 4, 2000; 69 FR 38856, June 29, 2004]

## § 141.76 Recycle provisions.

- (a) **Applicability.** All subpart H systems that employ conventional filtration or direct filtration treatment and that recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes must meet the requirements in paragraphs (b) through (d) of this section.
- (b) **Reporting.** A system must notify the State in writing by December 8, 2003, if the system recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes. This notification must include, at a minimum, the information specified in paragraphs (b)(1) and (2) of this section.
  - (1) A plant schematic showing the origin of all flows which are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are re-introduced back into the treatment plant.
  - (2) Typical recycle flow in gallons per minute (gpm), the highest observed plant flow experienced in the previous year (gpm), design flow for the treatment plant (gpm), and State-approved operating capacity for the plant where the State has made such determinations.
- (c) **Treatment technique requirement.** Any system that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes must return these flows through the processes of a system's existing conventional or direct filtration system as defined in § 141.2 or at an alternate location approved by the State by June 8, 2004. If capital improvements are required to modify the recycle location to meet this requirement, all capital improvements must be completed no later than June 8, 2006.

- (d) **Recordkeeping.** The system must collect and retain on file recycle flow information specified in paragraphs (d)(1) through (6) of this section for review and evaluation by the State beginning June 8, 2004.
- (1) Copy of the recycle notification and information submitted to the State under paragraph (b) of this section.
  - (2) List of all recycle flows and the frequency with which they are returned.
  - (3) Average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes.
  - (4) Typical filter run length and a written summary of how filter run length is determined.
  - (5) The type of treatment provided for the recycle flow.
  - (6) Data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used and average dose and frequency of use, and frequency at which solids are removed, if applicable.

[66 FR 31103, June 8, 2001]

## Subpart I—Control of Lead and Copper

**Source:** 56 FR 26548, June 7, 1991, unless otherwise noted.

### § 141.80 General requirements and action level.

- (a) **Applicability, effective date, and compliance deadlines.** The requirements of this subpart constitute the national primary drinking water regulations for lead and copper.
- (1) The provisions of this subpart apply to community water systems and non-transient, non-community water systems (in this subpart referred to as “water systems” or “systems”) as defined at § 141.2.
  - (2) The requirements of this subpart are effective as of December 30, 2024.
  - (3) Community water systems and non-transient non-community water systems must comply with the requirements of this subpart no later than November 1, 2027, except where otherwise specified in §§ 141.81, 141.84, 141.85, 141.86, and 141.90, or where an exemption in accordance with 40 CFR part 142, subpart C or F, has been issued by the Administrator.
  - (4)
    - (i) Between October 30, 2024, and November 1, 2027, community water systems and non-transient non-community water systems must comply with 40 CFR 141.2, 141.31(d), and 141.80 through 141.91, as codified on July 1, 2020, except systems must also comply with 40 CFR 141.84(a)(1) through (10) (excluding paragraphs (a)(6) and (7)), 141.85(a)(1)(ii) and (e), 141.90(e)(1) and (13), (f)(4), and (h)(3), 141.201(a)(3)(vi) and (c)(3), and 141.202(a)(10); 40 CFR part 141, appendix A to subpart Q, entry I.C.1 (excluding § 141.90, except paragraphs (e)(1) and (13) and (f)(4)) and entry I.C.2; 40 CFR part 141, appendix B to subpart Q, entry D.23; and 40 CFR 141.31(d)(2), as codified on July 1, 2024.

(ii) If an exemption from subpart I of this part has been issued in accordance with 40 CFR part 142, subpart C or F, prior to December 16, 2021, then the water systems must comply with 40 CFR 141.80 through 141.91, as codified on July 1, 2020, until the expiration of that exemption.

(b) **Scope.** The regulations in this subpart constitute a treatment technique rule that includes treatment techniques to control corrosion, treat source water, replace service lines, and provide public education. The regulations in this subpart include requirements to support the treatment technique including a service line inventory, tap sampling, and monitoring for lead in schools and child care facilities. Some of the requirements in this subpart only apply if there is an exceedance of the lead or copper action levels, specified in paragraph (c) of this section, as measured in samples collected at consumers' taps.

(c) **Lead and copper action levels and method for determining whether there is an exceedance of the action level.** Action levels must be determined based on tap water samples that must be considered for inclusion under § 141.86(e) for the purpose of calculating the 90th percentile and tested using the analytical methods specified in § 141.89. The action levels described in this paragraph (c) are applicable to all sections of subpart I of this part. Action levels for lead and copper are as follows:

(1) The lead action level is exceeded if the 90th percentile concentration of lead as specified in paragraph (c)(3) of this section is greater than 0.010 mg/L.

(2) The copper action level is exceeded if the 90th percentile concentration of copper as specified in paragraph (c)(3) of this section is greater than 1.3 mg/L.

(3) For purposes of this subpart, the 90th percentile concentration must be derived as follows:

(i) For water systems that do not have Tier 1 and/or Tier 2 sites and only have sites identified as Tier 3, 4, or 5 under § 141.86(a):

(A) The results of all lead or copper samples taken during a tap sampling period and eligible for inclusion in the 90th percentile calculation under § 141.86(e) must be placed in ascending order from the sample with the lowest concentration of lead or copper to the sample with the highest concentration of lead or copper. Each sampling result must be assigned a number, in ascending order beginning with the number 1 for the sample with the lowest concentration of lead or copper. The number assigned to the sample with the highest concentration must be equal to the total number of samples taken and considered for inclusion in the 90th percentile calculation, in accordance with § 141.86(e).

(B) The number of samples taken during the tap sampling period must be multiplied by 0.9.

(C) The 90th percentile concentration is the concentration of lead or copper in the numbered sample yielded after multiplying the number of samples by 0.9 in paragraph (c)(3)(i)(B) of this section.

(D) For water systems that collect five samples per tap sampling period, the 90th percentile concentration is the average of the highest and second highest concentration from the results in paragraph (c)(3)(i)(A) of this section.

(E) For a water system that is allowed by the State to collect fewer than five samples in accordance with § 141.86(a)(2) or has failed to meet their required minimum number of samples and collected fewer than five samples, the sample result with the highest concentration from the results in paragraph (c)(3)(i)(A) of this section is considered the 90th percentile value.

- (ii) For water systems with sites identified as Tier 1 or 2 under § 141.86(a) with sufficient Tier 1 and 2 sites to meet the minimum number of sites required in § 141.86(c) or (d) as applicable:
  - (A) For lead, water systems must include the higher of the first-liter and fifth-liter lead sample results at each Tier 1 and 2 site (or first-liter lead sample if tiering is based on premise plumbing) taken during the tap sampling period in paragraphs (c)(3)(ii)(B) through (D) of this section. For copper, water systems must include all first-liter copper samples collected at each Tier 1 and 2 site taken during the tap sampling period. Lead or copper sample results from Tier 3, 4, or 5 sites cannot be included in this calculation.
  - (B) The results of the lead or copper samples taken during a tap sampling period and eligible for inclusion in the 90th percentile calculation under § 141.86(e) identified in paragraph (c)(3)(ii)(A) of this section must be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result must be assigned a number, in ascending order beginning with the number 1 for the sample with the lowest concentration. The number assigned to the sample with the highest concentration must be equal to the total number of samples.
  - (C) The number of samples identified in paragraph (c)(3)(ii)(B) must be multiplied by 0.9.
  - (D) The 90th percentile concentration is the concentration of lead or copper in the numbered sample yielded after multiplying the number of samples by 0.9 in paragraph (c)(3)(ii)(C) of this section.
  - (E) For water systems that collect samples from five sites per tap sampling period, the 90th percentile concentration is the average of the highest and second highest concentration from the results in paragraph (c)(3)(ii)(B) of this section.
  - (F) For a water system that is allowed by the State to collect fewer than five copper samples or five first-liter-and-fifth-liter-paired lead samples in accordance with § 141.86(a)(2), or has failed to collect at least five copper samples or five first-liter-and fifth-liter-paired lead samples, the sample result with the highest concentration from the results in paragraph (c)(3)(ii)(B) is considered the 90th percentile value.
- (iii) For water systems with sites identified as Tier 1 or 2 under § 141.86(a) with an insufficient number of Tier 1 or 2 sites to meet the minimum number of sites required in § 141.86(c) or (d) as applicable:
  - (A) For lead, the system must use the higher value of the first-liter and fifth-liter lead sample for each Tier 1 or 2 site (or first-liter lead sample if tiering is based on premise plumbing) and the first-liter lead samples from sites in the next highest available tier (i.e., Tier 3, 4, and 5) to meet the minimum number of sites required in § 141.86(c) or (d) sampled during a tap sampling period for the steps in paragraphs (c)(3)(iii)(B) through (D) of this section. For copper, the system must use all first-liter copper samples collected.
  - (B) The results of all of the lead or copper samples identified in paragraph (c)(3)(iii)(A) of this section must be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. The water system must reduce this list to only include samples with the highest concentrations such that the number of sample results equals the minimum number of sites required to be sampled by § 141.86(c) or (d), as applicable. From this reduced list, each sampling result must be assigned a number, in

ascending order beginning with the number 1 for the sample with the lowest concentration. The number assigned to the sample with the highest concentration must be equal to the minimum number of sites required by § 141.86(c) or (d), as applicable.

- (C) The number of samples identified in paragraph (c)(3)(iii)(B) must be multiplied by 0.9.
- (D) The 90th percentile concentration is the concentration of lead or copper in the numbered sample yielded after multiplying the number of samples by 0.9 in paragraph (c)(3)(iii)(C) of this section.
- (E) For water systems that collect samples from five sites per tap sampling period, the 90th percentile concentration is the average of the highest and second highest concentration from the results in paragraph (c)(3)(iii)(B) of this section.
- (F) For a water system that is allowed by the State to collect fewer than five copper samples or five first-liter-and-fifth-liter-paired lead samples in accordance with § 141.86(a)(2), or has failed to collect at least five copper samples or five first-and-fifth-liter-paired lead samples, the sample result with the highest concentration from the results in paragraph (c)(3)(iii)(B) is considered the 90th percentile value.
- (G) If a water system does not collect enough samples sufficient to meet the minimum number of sites required in § 141.86(c) or (d), the system must calculate the 90th percentile lead and copper levels following the steps in § 141.80(c)(3)(i)(A) through (C).

[56 FR 26548, June 7, 1991; 57 FR 28788, June 29, 1992, as amended at 72 FR 57814, Oct. 10, 2007; 86 FR 4282, Jan. 15, 2021; 86 FR 31947, June 16, 2021; 89 FR 86626, Oct. 30, 2024]

## § 141.81 Applicability of corrosion control treatment steps to small, medium, and large water systems.

- (a) **Corrosion control treatment.** All water systems are required to install, optimize, or re-optimize optimal corrosion control treatment (OCCT) in accordance with this section. This section sets forth when a system must complete the corrosion control treatment steps under paragraph (d) or (e) of this section based on size, whether the system has corrosion control treatment, and whether it has exceeded the lead practical quantitation limit, lead action level, and/or the copper action level.
  - (1) **Large water systems (serving >50,000 people).**
    - (i) Large water systems with corrosion control treatment that exceed either the lead action level or copper action level must complete the re-optimized OCCT steps specified in paragraph (d) of this section unless the system:
      - (A) Has re-optimized OCCT once under paragraph (d) of this section after the compliance date in § 141.80(a)(3);
      - (B) Is meeting optimal water quality parameters designated by the State; and
      - (C) Is continuing to operate and maintain corrosion control treatment as required in § 141.82(g).
    - (ii) The State may require a large water system that does not have to re-optimize under paragraphs (a)(1)(i)(A) through (C) of this section to re-optimize under § 141.82(h).

- (iii) A large water system must meet the requirements under paragraph (d) of this section if it exceeds the lead action level at the end of a tap sampling period after completing service line replacement in accordance with the requirements in § 141.84(d) and there are no lead, galvanized requiring replacement, or lead status unknown service lines remaining in the system's inventory.
  - (iv) Large water systems with corrosion control treatment with 90th percentile results as calculated in accordance with § 141.80(c)(3) that exceed the lead practical quantitation limit of 0.005 mg/L but do not exceed the lead action level or the copper action level may be required by the State to complete the re-optimized OCCT steps in paragraph (d) of this section.
  - (v) Large water systems without corrosion control treatment with 90th percentile results as calculated in accordance with § 141.80(c)(3) that exceed either the lead practical quantitation limit of 0.005 mg/L or the copper action level must complete steps to study and install OCCT, as specified in paragraph (e) of this section.
- (2) **Medium water systems (serving >10,000 and ≤50,000 people).**
- (i) Medium water systems with corrosion control treatment that exceed either the lead action level or copper action level must complete the re-optimized OCCT steps specified in paragraph (d) of this section unless the system:
    - (A) Has re-optimized OCCT once under paragraph (d) of this section after the compliance date in § 141.80(a)(3);
    - (B) Is meeting optimal water quality parameters designated by the State; and
    - (C) Is continuing to operate and maintain corrosion control treatment as required in § 141.82(g).
  - (ii) The State may require a medium water system that does not have to re-optimize under paragraphs (a)(2)(i)(A) through (C) of this section to re-optimize under § 141.82(h).
  - (iii) After completing service line replacement in accordance with the requirements in § 141.84(d) and there are no lead, galvanized requiring replacement, or lead status unknown service lines remaining in the inventory, if at the end of a subsequent tap sampling period, the system exceeds the lead action level, a medium water system with corrosion control treatment must meet the requirements under paragraph (d) of this section.
  - (iv) Medium water systems with corrosion control treatment that do not exceed either the lead action level or the copper action level and do not have optimal water quality parameters designated by the State must complete the steps specified in paragraph (d) of this section starting with step 6 under paragraph (d)(6) of this section unless the system is deemed optimized under paragraph (b)(3) of this section.
  - (v) Medium water systems without corrosion control treatment that exceed either the lead or copper action level must complete the OCCT steps specified in paragraph (e) of this section.
- (3) **Small water systems (serving ≤10,000 people) and non-transient non-community water systems.**
- (i) Small and non-transient non-community water systems with corrosion control treatment that exceed either the lead action level or the copper action level, must complete the re-optimized OCCT steps specified in paragraph (d) of this section unless the system:

- (A) Has re-optimized OCCT once under paragraph (d) of this section after the compliance date in § 141.80(a)(3);
    - (B) Is meeting optimal water quality parameters designated by the State; and
    - (C) Is continuing to operate and maintain corrosion control treatment as required in § 141.82(g).
  - (ii) The State may require a small water system that does not have to re-optimize under paragraphs (a)(3)(i)(A) through (C) of this section to re-optimize under § 141.82(h).
  - (iii) After completing service line replacement in accordance with the requirements in § 141.84(d) and there are no lead, galvanized requiring replacement, or lead status unknown service lines remaining in the inventory, if at the end of a subsequent tap sampling period, the system exceeds the lead action level, a small water system with corrosion control treatment must meet the requirements under paragraph (d) of this section.
  - (iv) Small and non-transient non-community water systems without corrosion control treatment that exceed either the lead action level or copper action level must complete the corrosion control treatment steps specified in paragraph (e) of this section.
- (b) ***Systems deemed to have optimized corrosion control.*** A system without corrosion control treatment is deemed to have OCCT as defined in § 141.2 if the system meets the requirement of either paragraph (b)(1) or (3) of this section. A system with corrosion control treatment is deemed to have OCCT as defined in § 141.2 or re-optimized OCCT if the system meets the requirements of either paragraphs (b)(1) and (4) or (b)(3) and (4) of this section. Systems must submit documentation of meeting the applicable requirements to the State in accordance with § 141.90(c)(1) by the applicable deadline for submitting tap sampling results under § 141.90(a)(2).
- (1) A medium water system without corrosion control treatment or a small water system is deemed to have OCCT if the water system does not exceed the lead action level and copper action level during two consecutive six-month tap monitoring periods and then remains at or below the lead action level and copper action level in all tap sampling periods conducted in accordance with § 141.86.
    - (i) A small water system with corrosion control treatment is not eligible to be deemed to have OCCT pursuant to this paragraph (b)(1) where the State has set optimal water quality parameters (OWQPs) under paragraph (d) or (e) of this section.
    - (ii) If a medium water system without corrosion control treatment or a small water system deemed to have OCCT under this paragraph (b)(1) exceeds the lead action level or copper action level, the system must follow the requirements in paragraph (a) of this section.
  - (2) [Reserved]
  - (3) A water system is deemed to have optimized or re-optimized corrosion control treatment if it submits tap sampling results in accordance with § 141.86 demonstrating that the 90th percentile lead level is less than or equal to the lead practical quantitation limit of 0.005 mg/L for two consecutive six-month tap monitoring periods, it does not exceed the copper action level for two consecutive six-month tap monitoring periods, and it does not have OWQPs designated by the State under paragraph (d) or (e) of this section.



- (i) A system with 90th percentile tap sampling results that later exceeds the lead practical quantitation limit of 0.005 mg/L or copper action level during any tap sampling period is not eligible to be deemed to have optimized OCCT in accordance with this paragraph (b)(3) until the system has completed the treatment steps specified in paragraph (d) or (e) of this section.
- (ii) A system deemed to have OCCT in accordance with this paragraph (b)(3) must continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in § 141.86(d)(1) and collecting samples at times and locations specified in § 141.86(d)(2)(iii).
- (4) A system with corrosion control treatment deemed to have OCCT under this paragraph (b) must continue to operate and maintain the corrosion control treatment and also meet any additional requirements that the State determines are appropriate to ensure OCCT is maintained.

(c) [Reserved]

(d) ***Treatment steps and deadlines for water systems re-optimizing optimal corrosion control treatment.*** Water systems with corrosion control treatment that are required to re-optimize optimal corrosion control treatment under paragraph (a) of this section must complete the following steps (described in the referenced portions of §§ 141.82, 141.86, and 141.87) by the indicated time periods. Water systems must conduct tap sampling for lead and copper in accordance with the requirements of § 141.86 while they complete the corrosion control steps in this section.

(1) ***Step 1: Initiate mandatory pipe rig/loop or CCT study or treatment recommendation.***

- (i) Large or medium water systems with lead service lines that exceed the lead action level must harvest lead service lines from the distribution system and construct flowthrough pipe rigs/loops and operate the rigs/loops with finished water within one year after the end of the tap sampling period in which they exceeds the lead action level. These water systems must proceed to step 3 in paragraph (d)(3) of this section and conduct the corrosion control studies for re-optimization under paragraph (d)(3)(i) of this section using the pipe rigs/loops.
- (ii) Large water systems without lead service lines that exceed the lead action level or copper action level must conduct the corrosion control studies for re-optimization under paragraph (d)(3)(ii) of this section (step 3).
- (iii) A water system other than those covered in paragraph (d)(1)(i) or (ii) of this section must recommend re-optimized optimal corrosion control treatment (§ 141.82(a)) within six months after the end of the tap sampling period in which the system exceeded either the lead action level or copper action level.
- (iv) Systems may make an existing corrosion control treatment modification recommendation to the State within six months after the end of the tap sampling period in which the system exceeded the lead action level. The State must evaluate a system's past corrosion control treatment study results prior to approving an existing treatment modification. When a State approves existing treatment modifications, the State must specify re-optimized OCCT within 12 months after the end of the tap sampling period in which the system exceeded the lead action level. The system must complete modifications to corrosion control treatment to have re-optimized OCCT installed within six months of the State specifying re-optimized OCCT. These systems must proceed to step 6 in paragraph (d)(6) of this section and conduct follow-up monitoring.

- (2) **Step 2: State requires CCT study or State designates re-optimized OCCT.** Within one year after the end of the tap sampling period in which a medium water system without lead service lines or a small system exceeded the lead action level or copper action level, the State may require the water system to perform corrosion control studies for re-optimization (§ 141.82(c)(2)). If the State does not require the system to perform such studies, the State must specify re-optimized optimal corrosion control treatment (§ 141.82(d)) within the timeframes specified in paragraphs (d)(2)(i) and (ii) of this section. The State must provide its determination to the system in writing:
  - (i) For a medium water system, within one year after the end of the tap sampling period during which such water system exceeded the lead action level or copper action level.
  - (ii) For a small water system, within 18 months after the end of the tap sampling period in which such water system exceeded the lead action level or copper action level.
- (3) **Step 3: Study duration.**
  - (i) Any water system with lead service lines that exceeds the lead action level, in accordance with paragraph (d)(1)(i) of this section, must complete the pipe rig/loop corrosion control treatment studies and recommend re-optimized OCCT within 30 months after the end of the tap sampling period in which the system exceeded the lead action level.
  - (ii) If the water system is required to perform corrosion control studies under paragraph (d)(1)(ii) or (d)(2) of this section, the water system must complete the studies (§ 141.82(c)) and recommend re-optimized OCCT within 18 months after the end of the tap sampling period in which the system exceeded the lead or copper action level or after the State requires that such studies be conducted.
- (4) **Step 4: State designation of re-optimized OCCT based on CCT study results.** The State must designate re-optimized OCCT (§ 141.82(d)) within six months after the water system completes paragraph (d)(3)(i) or (ii) of this section (step 3).
- (5) **Step 5: Re-optimized OCCT installation deadlines.** Water systems must install re-optimized OCCT (§ 141.82(e)) within one year after the State completes paragraph (d)(4) of this section (step 4) or the State completes paragraph (d)(2)(i) or (ii) of this section (step 2).
- (6) **Step 6: Follow-up monitoring.** Water systems must complete standard monitoring for at least two consecutive tap monitoring periods under § 141.86(c)(2)(iii)(D) and water quality parameter monitoring under § 141.87(b)(3) after completing paragraph (d)(5) of this section (step 5). The first tap monitoring period for standard monitoring must begin on January 1 or July 1, whichever is sooner, after completing paragraph (d)(5) (step 5).
- (7) **Step 7: State sets optimal water quality parameters (OWQPs).** The State must review the water system's re-optimized OCCT and designate OWQPs (§ 141.82(f)) within six months after completing paragraph (d)(6) of this section (step 6).
- (8) **Step 8: Systems meet OWQPs to demonstrate compliance.** Water systems must comply with the State-designated OWQPs (§ 141.82(g)) and conduct tap sampling under § 141.86(c)(2)(iii)(E) and water quality parameter monitoring under § 141.87(b)(4).
- (e) **Treatment steps and deadlines for systems without corrosion control treatment.** Except as provided in paragraph (b) of this section, water systems without corrosion control treatment must complete the following corrosion control treatment steps (described in the referenced portions of §§ 141.82, 141.86,

and 141.87) by the indicated time periods. Water systems must conduct tap sampling for lead and copper in accordance with the requirements of § 141.86 while they complete the corrosion control steps in this section.

**(1) Step 1: Initiate mandatory pipe rig/loop or CCT study or treatment recommendation.**

- (i) A medium or large water system with lead service lines that exceeds the lead action level must harvest lead pipes from the distribution system and construct flowthrough pipe rigs/loops and operate the rigs/loops with finished water within one year after the end of the tap sampling period during which the system exceeded the lead action level. These water systems must proceed to step 3 in paragraph (e)(3) of this section and conduct the corrosion control studies for optimization under paragraph (e)(3)(i) of this section using the pipe rigs/loops.
- (ii) Large water systems under paragraph (a)(1)(v) of this section must conduct the corrosion control studies for optimization under paragraph (e)(3) of this section (step 3).
- (iii) A water system other than those covered in paragraph (e)(1)(i) or (ii) of this section must recommend optimal corrosion control treatment (OCCT) (§ 141.82(a)) within six months after the end of the tap sampling period during which the system exceeded either the lead action level or copper action level.

**(2) Step 2: State requires CCT study or State designates OCCT.** Within one year after the end of the tap sampling period in which the water system exceeded the lead action level or copper action level, the State may require the water system to perform corrosion control studies (§ 141.82(b)(1)) if those studies are not otherwise required by this subpart. The State must notify the system in writing of the requirement in the preceding sentence. If the State does not require the system to perform such studies, the State must specify OCCT (§ 141.82(d)) within the timeframes established in paragraphs (e)(2)(i) and (ii) of this section. The State must provide its determination to the system in writing:

- (i) For a medium water system, within 18 months after the end of the tap sampling period in which such water system exceeds the lead action level or copper action level.
- (ii) For a small water system, within 24 months after the end of the tap sampling period in which such water system exceeds the lead action level or copper action level.

**(3) Step 3: Study duration.**

- (i) Large and medium water systems with lead service lines that exceed the lead action level must complete the corrosion control treatment studies and recommend OCCT within 30 months after the end of the tap sampling period in which they exceeded the lead action level.
- (ii) If a water system is required to perform corrosion control studies under paragraph (e)(1)(ii) or (e)(2) of this section, the water system must complete the studies (§ 141.82(c)) and recommend OCCT within 18 months after the end of the tap sampling period in which the system exceeded the lead or copper action level or the State notifies the system in writing that such studies must be conducted.

**(4) Step 4: State designation of OCCT based on CCT study results.** The State must designate OCCT (§ 141.82(d)) within six months after water systems complete paragraph (e)(3)(i) or (ii) of this section (step 3).

- (5) **Step 5: OCCT installation deadlines.** Water systems must install OCCT (§ 141.82(e)) within 24 months after the State designates OCCT under paragraph (e)(2) or (4) of this section (step 2 or step 4).
  - (6) **Step 6: Follow-up monitoring.** Water systems must complete standard monitoring for at least two consecutive tap monitoring periods under § 141.86(c)(2)(iii)(D) and water quality parameter monitoring under § 141.87(b)(3) after completing paragraph (e)(5) of this section (step 5). The first tap monitoring period for standard monitoring must begin on January 1 or July 1, whichever is sooner, after completing paragraph (e)(5) (step 5).
  - (7) **Step 7: State sets optimal water quality parameters (OWQPs).** The State must review the water system's installation of treatment and designate OWQPs (§ 141.82(f)) within six months after completing paragraph (e)(6) of this section (step 6).
  - (8) **Step 8: Systems meet OWQPs to demonstrate compliance.** Water systems must comply with the State-designated OWQPs (§ 141.82(g)) and conduct tap sampling under § 141.86(c)(2)(iii)(E) and water quality parameter monitoring under § 141.87(b)(4).
- (f) **Systems with lead or galvanized requiring replacement service lines that can complete full service line replacement in five years or less.**
- (1) A water system with one or more lead or galvanized requiring replacement service lines is not required to complete the steps under paragraph (d) or (e) of this section if the system meets all the following requirements:
    - (i) Deadline to complete mandatory service line replacement.
      - (A) A water system must complete the service line replacement requirements under § 141.84(d) in five years or less from the date of the end of the tap sampling period in which the system first exceeds the lead action level; or
      - (B) A large water system without corrosion control treatment must complete the service line replacement requirements under § 141.84(d) in five years or less from the date of the end of the tap sampling period in which the system's 90th percentile results first exceed the lead practical quantitation limit; and
      - (C) For a water system with less than five years remaining to complete mandatory service line replacement in accordance with § 141.84(d), the system must complete the service line replacement requirements under this paragraph (f)(1)(i) by that deadline.
    - (ii) At a minimum, a system must replace the total number of lead and/or galvanized requiring replacement service lines each year, as identified in that system's inventory on the date of the end of the tap sampling period in which the system first exceeds the lead action level or in which the system's 90th percentile first exceeds the lead practical quantitation limit, whichever applies, at an annual rate equally divided by the total number of years for service line replacement provided in paragraph (f)(1)(i) of this section. For purposes of calculating the annual rate, the system must replace all lead and galvanized requiring replacement service lines within the least number of years feasible not to exceed five years from the date of the end of the tap sampling period in which the system first exceeds the lead action level or in which the system's 90th percentile first exceeds the lead practical quantitation limit, whichever

applies. If the State determines a replacement deadline less than five years is feasible for a water system, the system must replace service lines by that deadline and establish an annual replacement rate based on that number of years until that deadline.

(iii) By the end of the five-year-or-less period in paragraph (f)(1)(i) of this section, the system must have replaced all lead and galvanized requiring replacement service lines calculated in accordance with § 141.84(d)(6) (i.e., no lead, galvanized requiring replacement or lead status unknown service lines remain in the inventory), and identified the material of all lead status unknown service lines, completed the inventory validation requirements in accordance with § 141.84(b)(5), and replaced all unknowns found to be lead or galvanized requiring replacement service lines.

(iv) Except as provided in this section, all other requirements in § 141.84(d) apply.

(2) Throughout the five-year-or-less period in paragraph (f)(1)(i) of this section, systems with corrosion control treatment must continue to operate and maintain corrosion control treatment in addition to completing the mandatory service line replacement requirements under this section.

(3) A water system that does not replace lead and/or galvanized requiring replacement service lines calculated in accordance with § 141.84(d)(6) at the minimum annual rate provided in paragraph (f)(1)(ii) of this section in any one year of the five-year-or-less period in paragraph (f)(1)(i) of this section or complete the service line replacement requirements under § 141.84(d) in accordance with paragraph (f)(1)(iii) of this section, must meet the requirements under paragraph (d) or (e) of this section, as applicable, starting immediately after the system fails to meet the annual removal requirements under paragraph (f)(1)(ii).

(4) At the end of each year of the five-year-or-less period, the system must submit written documentation to the State about the number of lead and galvanized requiring replacement service lines removed that year and whether the minimum annual replacement rate in paragraph (f)(1)(ii) of this section was met. If a system reports or a State determines that the system did not meet its minimum annual replacement rate that year, the system is no longer eligible to defer the requirements under paragraph (d) or (e) of this section, and must meet those requirements, as applicable.

(5) After completing service line replacement in accordance with the requirements in this paragraph (f), a water system must meet the requirements under paragraph (d) or (e) of this section, as applicable, if at the end of a subsequent tap sampling period, the system either exceeds the lead action level or the lead practical quantitation limit, whichever is applicable.

(g) ***Completing corrosion control steps for small and medium water systems without corrosion control treatment.***

(1) Any small or medium water system without corrosion control treatment required to complete the steps in paragraph (e) of this section that does not exceed the lead action level and copper action level during two consecutive six-month tap monitoring periods pursuant to § 141.86 prior to the start of step 3 in paragraph (e)(3) of this section or prior to or concurrent with the end of step 4 in paragraph (e)(4) of this section may stop completing the steps and is not required to complete paragraph (e)(3) or (5) (step 3 or step 5), respectively, except that medium water systems without corrosion control treatment and with lead service lines must complete a corrosion control treatment study under paragraph (e)(3)(i) of this section. A 90th percentile level at or below the lead action

level or copper action level based on less than the required minimum number of samples under § 141.86 cannot be used to meet the requirements of this paragraph (g)(1). Eligible systems can only use the exception in this paragraph (g)(1) once.

- (2) Any system that starts step 5 in accordance with paragraph (e)(5) of this section must complete all remaining steps (*i.e.*, steps 6 through 8) in paragraphs (e)(6) through (8) of this section and is not permitted to stop the steps.
  - (3) Any small or medium water system without corrosion control treatment under paragraph (g)(1) of this section that stopped the steps in paragraph (e) of this section and subsequently exceeds either the lead action level or copper action level must complete the corrosion control treatment steps in paragraph (e) beginning with the first treatment step that was not completed.
  - (4) The State may require a water system to repeat treatment steps previously completed by the water system when the State determines that this is necessary to implement the treatment requirements of this section. The State must notify the system in writing of such a determination and explain the basis for its decision.
- (h) **Notification requirements for upcoming long-term change in treatment or source.** At a time specified by the State, or if no specific time is designated, as early as possible but no later than six months prior to the addition of a new source or any long-term change in water treatment, a water system must submit written documentation describing the addition of a new source or long-term change in treatment to the State. Systems may not implement the addition of a new source or long-term treatment change without State approval. The State must review and approve the addition of a new source or long-term change in water treatment before it can be implemented by the water system. The State may require any such water system to take actions before or after the addition of a new source or long-term treatment change to ensure that the water system will operate and maintain optimal corrosion control treatment, such as additional water quality parameter monitoring, additional lead or copper tap sampling, and re-evaluating corrosion control treatment. Examples of long-term treatment changes include but are not limited to the addition of a new treatment process or modification of an existing treatment process. Examples of modifications include switching secondary disinfectants, switching coagulants (*e.g.*, alum to ferric chloride), and switching corrosion inhibitor products (*e.g.*, orthophosphate to blended phosphate). Long-term treatment changes can also include dose changes to existing chemicals if the system is planning long-term changes to its finished water pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily raw water quality changes where a new source has not been added.

[89 FR 86627, Oct. 30, 2024]

## § 141.82 Description of corrosion control treatment requirements.

This section provides the requirements for systems and States designating optimal corrosion control treatment (OCCT) for a system that is optimizing or re-optimizing OCCT. All systems must complete the corrosion control treatment requirements in this section as applicable under § 141.81.

- (a) **System recommendation regarding corrosion control treatment.**
- (1) Any system without corrosion control treatment that is required to recommend a treatment option in accordance with § 141.81(e)(1)(iii) must, based on the results of lead and copper tap sampling and water quality parameter monitoring, recommend designating one or more of the corrosion control

treatments listed in paragraph (c)(1) of this section to the State as the optimal corrosion control treatment for that system. The State may require the system to conduct additional water quality parameter monitoring to assist the State in reviewing the system's recommendation.

- (2) Any system with corrosion control treatment that exceeds the lead action level that is required to recommend a treatment option to the State in accordance with § 141.81(d)(1)(iii) must recommend designating one or more of the corrosion control treatments listed in paragraph (c)(2) of this section as the optimal corrosion control treatment for that system.
- (3) States may waive the requirement for a system to recommend OCCT if the State requires the system, in writing, to complete a corrosion control study within three months after the end of the tap sampling period in which the lead or copper action level exceedance occurred. These systems must proceed directly to paragraph (c) of this section and complete a corrosion control study.

**(b) *State decision to require studies to identify initial OCCT under § 141.81(e)(2) and re-optimized OCCT under § 141.81(d)(2).***

- (1) The State may require any small or medium water system without corrosion control treatment that exceeds either the lead action level or copper action level to perform corrosion control treatment studies under paragraph (c)(1) of this section to identify OCCT for the system.
- (2) The State may require any small or medium water system with corrosion control treatment exceeding either the lead action level or copper action level to perform corrosion control treatment studies under paragraph (c)(2) of this section to identify re-optimized OCCT for the system (*i.e.*, OCCT after a re-optimization evaluation).

**(c) *Performance of corrosion control studies.***

- (1) Systems without corrosion control treatment required to conduct corrosion control studies under § 141.81(e) must evaluate the effectiveness of each of the following treatments, and if appropriate, combinations of the following treatments, to identify OCCT for the system:
  - (i) Alkalinity and pH adjustment;
  - (ii) The addition of an orthophosphate- or a silicate-based corrosion inhibitor at a concentration sufficient to maintain an effective corrosion inhibitor residual concentration in all test samples;
  - (iii) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain an orthophosphate residual concentration of 1 mg/L (as PO<sub>4</sub>) in all test samples; and
  - (iv) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain an orthophosphate residual concentration of 3 mg/L (as PO<sub>4</sub>) in all test samples.
- (2) Systems with corrosion control treatment required to conduct corrosion control studies under § 141.81(d) must evaluate the effectiveness of the following treatments, and if appropriate, combinations of the following treatments, to identify re-optimized OCCT for the system:
  - (i) Alkalinity and/or pH adjustment or re-adjustment;
  - (ii) The addition of an orthophosphate- or a silicate-based corrosion inhibitor at a concentration sufficient to maintain an effective corrosion inhibitor residual concentration in all test samples if no such inhibitor is currently utilized;

- (iii) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain an orthophosphate residual concentration of 1 mg/L (as  $\text{PO}_4$ ) in all test samples unless the current inhibitor process already meets this residual; and
  - (iv) The addition of an orthophosphate-based corrosion inhibitor at a concentration sufficient to maintain an orthophosphate residual concentration of 3 mg/L (as  $\text{PO}_4$ ) in all test samples unless the current inhibitor process already meets this residual.
- (3) Systems must evaluate each of the corrosion control treatments specified in paragraph (c)(1) or (2) of this section individually or, if appropriate, in combinations, using pipe rig/loop tests, metal coupon tests, partial-system tests, and/or analyses based on documented analogous treatments with similar size systems that have a similar water chemistry and similar distribution system configurations. Large and medium water systems with lead service lines, and other systems as required by the State, that exceed the lead action level must conduct pipe rig/loop studies using harvested lead service lines from their distribution systems to assess the effectiveness of corrosion control treatment options on the existing pipe scale. Metal coupon tests can be used as a screen to reduce the number of options evaluated in the pipe rig/loop studies to the current water quality and at least two additional treatment options.
- (4) Systems must measure the following water quality parameters in any tests conducted under paragraph (c)(3) of this section both before and after evaluating the corrosion control treatments listed in paragraph (c)(1) or (2) of this section:
  - (i) Lead;
  - (ii) Copper;
  - (iii) pH;
  - (iv) Alkalinity;
  - (v) Orthophosphate as  $\text{PO}_4$  (when an orthophosphate-based inhibitor is used);
  - (vi) Silicate (when a silicate-based inhibitor is used); and
  - (vii) Any additional parameters necessary to evaluate the effectiveness of a corrosion control treatment as determined by the State.
- (5) Systems must identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document those constraints by providing either of the following:
  - (i) Data and documentation showing a particular corrosion control treatment has adversely affected other drinking water treatment processes when used by another water system with comparable water quality characteristics. Systems using metal coupon tests to screen and/or pipe rig/loop studies to evaluate treatment options cannot exclude treatment strategies from the studies based on the constraints identified in this paragraph (c)(5)(i).
  - (ii) Data and documentation demonstrating the water system previously attempted to evaluate a particular corrosion control treatment and found the treatment was ineffective or adversely affects other drinking water quality treatment processes. Systems using metal coupon tests to screen and/or pipe rig/loop studies to evaluate treatment options cannot exclude treatment strategies from the studies based on the constraints identified in this paragraph (c)(5)(ii), unless the treatment was found to be ineffective in a previous pipe rig/loop study.



- (6) Systems must evaluate the effect of the chemicals used for corrosion control treatment on other drinking water quality treatment processes. Systems using metal coupon tests to screen and/or pipe rig/loop studies to evaluate treatment options cannot exclude any of the required treatment strategies specified in paragraph (c)(1) or (2) of this section from the studies based on the effects identified in this section.
- (7) Based on the data and analysis for each treatment option evaluated under this paragraph (c), systems must recommend to the State, in writing, the treatment option that the corrosion control studies indicate constitutes OCCT for that system as defined in § 141.2. Systems must provide the State with a rationale for the OCCT recommendation and all supporting documentation specified in paragraph (c)(1) or (2) and paragraphs (c)(3) through (7) of this section.

(d) ***State designation of OCCT and re-optimized OCCT –***

- (1) ***Designation of OCCT or re-optimized OCCT.*** Based on available information including, where applicable, studies conducted under paragraph (c)(1) or (2) of this section and/or a system's recommended corrosion control treatment option, the State must either approve the corrosion control treatment option recommended by the system or designate alternative corrosion control treatment(s) from among those listed in paragraph (c)(1) or (2) of this section, as applicable. The State must notify the water system, in writing, of its designation of OCCT or re-optimized OCCT and explain the basis for this determination.
  - (i) When designating OCCT, the State must consider the effects that additional corrosion control treatment will have on water quality parameters and other drinking water quality treatment processes.
  - (ii) If the State requests additional information to aid its review, the water system must provide that information.

(2) [Reserved]

- (e) ***Installation of OCCT and re-optimized OCCT.*** Each system must install and operate the OCCT or re-optimized OCCT designated by the State under paragraph (d) of this section throughout its distribution system.
- (f) ***State review of treatment and designation of optimal water quality parameters for OCCT and re-optimized OCCT.*** The State must evaluate the results of all lead and copper tap and water quality parameter sampling submitted by the water system and determine whether the water system has installed and operated the OCCT designated by the State in paragraph (d) of this section. Upon reviewing the system's tap and water quality parameter sampling results, both before and after the water system installs OCCT, or re-optimizes OCCT, the State must designate each of the following:
  - (1) A minimum value or a range of values for pH measured at each entry point to the distribution system.
  - (2) A minimum pH value measured in all distribution system samples. This value must be equal to or greater than 7.0, unless the State determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for OCCT.
  - (3) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for orthophosphate (as PO<sub>4</sub>) or silicate measured at each entry point to the distribution system.

- (4) If a corrosion inhibitor is used, a minimum orthophosphate (as  $\text{PO}_4$ ) or silicate concentration measured in all tap samples that the State determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system. When orthophosphate is used, for OCCT designations for systems previously without corrosion control treatment, the orthophosphate concentration must be equal to or greater than 0.5 mg/L (as  $\text{PO}_4$ ) and for OCCT designations for systems previously with corrosion control treatment, the orthophosphate concentration must be equal to or greater than 1.0 mg/L, unless the State determines that meeting the applicable minimum orthophosphate residual is not technologically feasible or is not necessary for OCCT.
- (5) If alkalinity is adjusted as part of OCCT, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples.
- (6) The values for the applicable water quality parameters in paragraphs (f)(1) through (5) of this section must be the values the State determines reflect OCCT or re-optimized OCCT for the water system. The State may designate values for additional water quality parameters the State determines reflect OCCT or re-optimized OCCT for the water system. The State must notify the system, in writing, of these determinations and explain the basis for its decisions.

(g) ***Continued operation and monitoring for OCCT and re-optimized OCCT.*** All systems, including those optimizing or re-optimizing OCCT, must continue to operate and maintain OCCT, including maintaining water quality parameters at or above the minimum values or within the ranges designated by the State under paragraph (f) of this section, in accordance with this paragraph (g) for all water quality parameter samples collected under § 141.87(b)(4) through (d). The requirements of this paragraph (g) apply to all systems, including consecutive systems that distribute water that has been treated to control corrosion by another system, and any water system with corrosion control treatment, OCCT, or re-optimized OCCT that is not required to monitor water quality parameters under § 141.87.

- (1) Compliance with the requirements of this paragraph (g) must be determined every six months, as specified under § 141.87(b)(4). A water system is out of compliance with the requirements of this paragraph (g) for a six-month period if it has excursions for any State-specified parameter on more than nine days, cumulatively, during the period. An excursion occurs whenever the daily value for one or more of the water quality parameters measured at a sampling location is below the minimum value or outside the range designated by the State. Daily values are calculated as set out in paragraph (g)(2) of this section. States have discretion to not include results of obvious sampling errors from this calculation. Sampling errors must still be recorded even when not included in calculations.

(2)

- (i) On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value must be the average of all results collected at that sampling location during the same day regardless of whether they are collected through continuous monitoring, grab sampling, or a combination of both. If EPA has approved an alternative formula under § 142.16(d)(1)(ii) of this chapter in the State's application for a program revision submitted pursuant to § 142.12 of this chapter, the State's formula must be used to aggregate multiple measurements taken at a sampling point for the water quality parameters in lieu of the formula in this paragraph (g)(2).

- (ii) On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value must be the result of that measurement.

- (iii) On days when no measurement is collected for the water quality parameter at the sampling location, the daily value must be the daily value calculated on the most recent day on which the water quality parameter was measured at the sampling location.

(h) **Modification of State treatment determination for OCCT and re-optimized OCCT.** Upon its own initiative or in response to a request by a water system or other interested party, a State may modify its determination of OCCT under paragraph (d) of this section, or optimal water quality parameters under paragraph (f) of this section. A request for modification by a system or other interested party must be in writing, explaining why the modification is appropriate, and providing supporting documentation. The State may require a system to conduct a CCT study to support modification of the determination of OCCT or re-optimized OCCT. The State may modify its determination where it concludes that such change is necessary to ensure that the water system continues to optimize corrosion control treatment. A revised designation must be made in writing, set forth the new treatment requirements and/or optimal water quality parameters, explain the basis for the State's determination, and provide an implementation schedule for completing the treatment modifications for re-optimized corrosion control treatment.

(i) **Treatment decisions by EPA in lieu of the State on OCCT and re-optimized OCCT.** Pursuant to the procedures in § 142.19 of this chapter, the EPA Regional Administrator may review OCCT determinations made by a State under paragraph (d), (f), or (h) of this section and issue Federal corrosion control treatment determinations consistent with the requirements of paragraph (d), (f), or (h) where the EPA Regional Administrator finds that:

- (1) A State failed to issue a treatment determination by the applicable deadlines contained in § 141.81;
- (2) A State abused its discretion; or
- (3) The technical aspects of a State's determination would be indefensible in a Federal enforcement action taken against a water system.

(j) **Distribution System and Site Assessment for tap sample sites with lead results that exceed 0.010 mg/L.** The water system must conduct the following steps when the lead results from an individual tap sample site sampled under § 141.86 exceed 0.010 mg/L and the site is included in the site sample plan under § 141.86(a)(1):

(1) **Step 1: Corrosion control treatment assessment.** Within five days of receiving the tap sampling results, the water system must sample at a water quality parameter site in accordance with paragraph (j)(1)(ii) of this section that is on the same size water main in the same pressure zone and located within a half mile radius of the site with the lead result exceeding 0.010 mg/L. Water systems without corrosion control treatment are not required to collect these samples.

(i) The water system must measure the following water quality parameters:

- (A) pH;
- (B) Alkalinity;
- (C) Orthophosphate (as PO<sub>4</sub>), when an inhibitor containing an orthophosphate compound is used; and
- (D) Silica, when an inhibitor containing a silicate compound is used.

(ii) The water system must measure at the following locations:

- (A) Water systems with an existing water quality parameter site that meets the requirements in this paragraph (j)(1) can conduct this sampling at that site.
  - (B) All water systems required to meet optimal water quality parameters but do not have an existing water quality parameter site that meets the requirements in this paragraph (j)(1) must add new sites to the minimum number of sites as described in § 141.87(b)(1)(i). Sites must be added until a system has twice the minimum number of sites listed in table 1 to § 141.87(b)(1)(i). When a system exceeds twice the number of sites, the State has discretion to determine if these additional newer sites can better assess the effectiveness of the corrosion control treatment and whether to remove existing sites during sanitary survey evaluation of OCCT.
- (2) **Step 2: Site assessment.** Within 30 days of receiving the tap sampling results, water systems must collect and analyze a follow-up sample for lead at any tap sample site that exceeds 0.010 mg/L. These follow-up samples may use different sample volumes or different sample collection procedures to assess the source of elevated lead levels. Samples collected under this section must be submitted to the State but cannot be included in the 90th percentile calculation for compliance monitoring under § 141.86. If the water system is unable to collect a follow-up sample at a site, the water system must provide documentation to the State, as specified in § 141.90(g)(2), explaining why it was unable to collect a follow-up sample.
  - (3) **Step 3: Evaluate results and system treatment recommendation.** Water systems must evaluate the results of the sampling conducted under paragraphs (j)(1) and (2) of this section to determine if either localized or centralized adjustment of the OCCT or other distribution system actions are necessary and submit the recommendation to the State within six months after the end of the tap sampling period in which the site(s) exceeded 0.010 mg/L. Corrosion control treatment modification may not be necessary to address every exceedance of 0.010 mg/L. Other distribution system actions may include flushing to reduce water age. Water systems must note the cause of the elevated lead level, if known from the site assessment, in their recommendation to the State as site-specific issues can be an important factor in why the system is not recommending any adjustment of corrosion control treatment or other distribution system actions. Systems in the process of optimizing or re-optimizing OCCT under paragraphs (a) through (f) of this section do not need to submit a treatment recommendation for distribution system and site assessment.
  - (4) **Step 4: State approval of treatment recommendation.** The State must approve the treatment recommendation or specify a different approach within six months of completing step 3 as described in paragraph (j)(3) of this section and notify the water system in writing.
  - (5) **Step 5: Modifications to OCCT.** If the State-approved treatment recommendation requires the water system to adjust the OCCT process, the water system must complete modifications to its corrosion control treatment within 12 months of receiving notification from the State as described in paragraph (j)(4) of this section. Systems without corrosion control treatment required to install OCCT must follow the schedule in § 141.81(e).
  - (6) **Step 6: Follow-up sampling.** Water systems adjusting OCCT must complete follow-up sampling in accordance with §§ 141.86(c)(2)(iii)(D) and 141.87(b)(3) within 12 months after completing step 5 as described in paragraph (j)(5) of this section and submit sampling results to the State in accordance with §§ 141.86 and 141.87.

- (7) **Step 7: State OWQP designation.** For water systems adjusting OCCT, the State must review the water system's modification of corrosion control treatment and designate optimal water quality parameters in accordance with paragraph (f) of this section within six months of receiving sampling result in paragraph (j)(6) of this section.
- (8) **Step 8: Operate in compliance.** For a water system adjusting OCCT, the water system must operate in compliance with the State-designated optimal water quality parameters in accordance with paragraph (g) of this section and continue to conduct tap sampling in accordance with §§ 141.86(c)(2)(iii)(E) and 141.87(b)(4).

[89 FR 86631, Oct. 30, 2024]

### § 141.83 Source water treatment requirements.

Systems shall complete the applicable source water monitoring and treatment requirements (described in the referenced portions of paragraph (b) of this section, and in §§ 141.86, and 141.88) by the following deadlines.

(a) **Deadlines for completing source water treatment steps —**

- (1) **Step 1:** A system exceeding the lead or copper action level shall complete lead and copper source water monitoring (§ 141.88(b)) and make a treatment recommendation to the State (§ 141.83(b)(1)) no later than 180 days after the end of the monitoring period during which the lead or copper action level was exceeded.
- (2) **Step 2:** The State shall make a determination regarding source water treatment (§ 141.83(b)(2)) within 6 months after submission of monitoring results under step 1.
- (3) **Step 3:** If the State requires installation of source water treatment, the system shall install the treatment (§ 141.83(b)(3)) within 24 months after completion of step 2.
- (4) **Step 4.** The system shall complete follow-up tap water monitoring (§ 141.86(c)(2)(iii)(F)) and source water monitoring (§ 141.88(c)) within 36 months after completion of step 2 as described in paragraph (a)(2) of this section.
- (5) **Step 5:** The State shall review the system's installation and operation of source water treatment and specify maximum permissible source water levels (§ 141.83(b)(4)) within 6 months after completion of step 4.
- (6) **Step 6:** The system shall operate in compliance with the State-specified maximum permissible lead and copper source water levels (§ 141.83(b)(4)) and continue source water monitoring (§ 141.88(d)).

(b) **Description of source water treatment requirements —**

- (1) **System treatment recommendation.** Any system which exceeds the lead or copper action level shall recommend in writing to the State the installation and operation of one of the source water treatments listed in paragraph (b)(2) of this section. A system may recommend that no treatment be installed based upon a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.
- (2) **State determination regarding source water treatment.** The State shall complete an evaluation of the results of all source water samples submitted by the water system to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps. If

the State determines that treatment is needed, the State shall either require installation and operation of the source water treatment recommended by the system (if any) or require the installation and operation of another source water treatment from among the following: Ion exchange, reverse osmosis, lime softening or coagulation/filtration. If the State requests additional information to aid in its review, the water system shall provide the information by the date specified by the State in its request. The State shall notify the system in writing of its determination and set forth the basis for its decision.

- (3) **Installation of source water treatment.** Each system shall properly install and operate the source water treatment designated by the State under paragraph (b)(2) of this section.
- (4) **State review of source water treatment and specification of maximum permissible source water levels.** The State shall review the source water samples taken by the water system both before and after the system installs source water treatment, and determine whether the system has properly installed and operated the source water treatment designated by the State. Based upon its review, the State shall designate the maximum permissible lead and copper concentrations for finished water entering the distribution system. Such levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The State shall notify the system in writing and explain the basis for its decision.
- (5) **Continued operation and maintenance.** Each water system shall maintain lead and copper levels below the maximum permissible concentrations designated by the State at each sampling point monitored in accordance with § 141.88. The system is out of compliance with this paragraph if the level of lead or copper at any sampling point is greater than the maximum permissible concentration designated by the State.
- (6) **Modification of State treatment decisions.** Upon its own initiative or in response to a request by a water system or other interested party, a State may modify its determination of the source water treatment under paragraph (b)(2) of this section, or maximum permissible lead and copper concentrations for finished water entering the distribution system under paragraph (b)(4) of this section. A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The State may modify its determination where it concludes that such change is necessary to ensure that the system continues to minimize lead and copper concentrations in source water. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the State's decision, and provide an implementation schedule for completing the treatment modifications.
- (7) **Treatment decisions by EPA in lieu of the State.** Pursuant to the procedures in § 142.19, the EPA Regional Administrator may review treatment determinations made by a State under paragraphs (b)(2), (4), or (6) of this section and issue Federal treatment determinations consistent with the requirements of those paragraphs where the Administrator finds that:
  - (i) A State has failed to issue a treatment determination by the applicable deadlines contained in § 141.83(a),
  - (ii) A state has abused its discretion in a substantial number of cases or in cases affecting a substantial population, or
  - (iii) The technical aspects of a State's determination would be indefensible in an expected Federal enforcement action taken against a system.

## § 141.84 Service line inventory and replacement requirements.

- (a) ***Service line and connector inventory development.*** All water systems must develop a service line inventory that identifies the material and location of each service line connected to the public water distribution system. The inventory must include all service lines connected to the public water distribution system regardless of ownership status (e.g., where service line ownership is shared, the inventory includes both the portion of the service line owned by the water system and the portion of the service line owned by the customer). The inventory must meet the following requirements:
- (1) All water systems are required to develop an initial inventory and submit it to the State by October 16, 2024, as specified in § 141.80(a)(4)(i).
  - (2) All water systems must develop an updated initial inventory, known as the “baseline inventory”. Systems must submit the baseline inventory to the State by the compliance date in § 141.80(a)(3). Newly regulated public water systems, as defined in § 141.2, must develop a baseline inventory on a schedule established by the State that does not exceed three years from the date the system becomes subject to National Primary Drinking Water Regulations in this part. The baseline inventory must include each service line and identified connector that is connected to the public water distribution system regardless of ownership status (e.g., where service line ownership is shared, the inventory includes both the portion of the service line owned by the water system and the portion of the service line owned by the customer).
    - (i) For the baseline inventory, water systems must conduct a review of any information listed in paragraphs (b)(2)(i) through (iii) of this section that describes connector materials and locations. Water systems must also conduct a review of any information on lead and galvanized iron or steel materials that they have identified pursuant to § 141.42(d) to identify connector materials and locations. The water system may use other sources of information not listed in paragraphs (b)(2)(i) through (iii) if approved or required by the State.
    - (ii) Water systems must include each connector identified in paragraph (a)(2)(i) of this section in their baseline inventory. Connector materials must be categorized in the following manner:
      - (A) “Lead” where the connector is made of lead.
      - (B) “Non-Lead” where the connector is determined through an evidence-based record, method, or technique not to be made of lead. Water systems are not required to identify the specific material of a non-lead connector; however, they may use the material (e.g., copper or galvanized) as an alternative to categorizing it as “Non-Lead”.
      - (C) “Unknown” where the material of the connector is not known.
      - (D) “No connector present” where there is no connector at the location (e.g., where a service line directly connects a water main to a building inlet).
    - (iii) All water systems must include any new information on service line materials from all applicable sources described in paragraph (b)(2) of this section in the baseline inventory.
  - (3) Each service line, or portion of the service line where ownership is shared, must be categorized in the following manner:
    - (i) “Lead” where the service line is a lead service line as defined in § 141.2.
    - (ii) “Galvanized Requiring Replacement” where the service line is a galvanized requiring replacement service line as defined in § 141.2.

- (iii) "Non-Lead" where the service line is determined through an evidence-based record, method, or technique not to be a lead or galvanized requiring replacement service line. Water systems are not required to identify the specific material of a non-lead service line; however, they may use the material (e.g., plastic or copper) as an alternative to categorizing it as "Non-Lead".
- (iv) "Lead Status Unknown" or "Unknown" where the service line material is not known to be lead, galvanized requiring replacement, or non-lead, such as where there is no documented evidence or evidence reliably supporting material categorization. Water systems may elect to provide more information regarding their unknown service lines as long as the inventory clearly distinguishes unknown service lines from those where the categorization of the material is based on the categorization methods approved under paragraph (b)(2) of this section.
- (4) The inventory must include a street address associated with each service line and connector. Where a street address is not available for an individual service line or connector, a unique locational identifier (e.g., block, Global Positioning System or GPS coordinates, intersection, or landmark) may be used.
- (5) The inventory must be publicly accessible.
  - (i) The publicly accessible inventory must include the information described in paragraphs (a)(2) through (4) of this section and be updated in accordance with paragraph (b) of this section.
  - (ii) Water systems serving greater than 50,000 persons must make the publicly accessible inventory available online.
- (6) When a water system has no lead, galvanized requiring replacement, or lead status unknown service lines, no known lead connectors, and no connectors of unknown material, it may comply with the requirements in paragraph (a)(5) of this section using a written statement in lieu of the publicly accessible inventory, declaring that the distribution system has no lead, galvanized requiring replacement, or lead status unknown service lines, no known lead connectors, and no connectors of unknown material. The statement must include a general description of all applicable sources used in the inventory as described in paragraphs (a)(1) and (2) and (b)(2) of this section to make this determination.
- (7) Instructions to access the publicly accessible inventory (including inventories consisting only of a statement in accordance with paragraph (a)(6) of this section) must be included in the Consumer Confidence Report in accordance with § 141.153(h)(8)(ii).

**(b) *Additional requirements for service line and connector inventory maintenance.***

- (1) All water systems must update the baseline inventory of service lines and connectors developed in paragraph (a)(2) of this section and submit the updates to the State on an annual basis in accordance with § 141.90(e)(4). These updates begin one year after the compliance date in § 141.80(a)(3). The publicly accessible inventory must reflect any updates no later than the deadline to submit the updated inventory to the State.
  - (i) All water systems must identify the material of all lead status unknown service lines by the applicable mandatory service line replacement deadline in paragraph (d)(4) of this section.
  - (ii) Water systems whose inventories contain only non-lead service lines and non-lead connectors or no connectors present are not required to provide updated inventories to the State or updates to the publicly accessible inventory. If, in the future, such a water system discovers a lead service line, galvanized requiring replacement service line, or lead connector within its



system, the system must notify the State no later than 60 days after the discovery, prepare an updated inventory in accordance with this section on a schedule established by the State, replace the lead or galvanized requiring replacement service line in accordance with paragraph (d)(4)(ii) of this section, and replace any lead connector along the service line in accordance with paragraph (e) of this section.

- (2) Water systems must update the inventory annually with any new information acquired from all applicable sources described in paragraphs (b)(2) through (4) of this section and follow all applicable requirements for the inventory in paragraphs (a) and (b) of this section. The water system may update the inventory using other sources of information not listed in paragraphs (b)(2)(i) through (iii) of this section if the use of those sources is approved or required by the State.
  - (i) All construction and plumbing codes, permits, and records or other documentation that indicate the service line and connector materials used to connect structures to the distribution system.
  - (ii) All water system records on service lines and connectors, including distribution system maps and drawings, recent or historical records on each service connection and connector, meter installation records, historical capital improvement or master plans, and standard operating procedures.
  - (iii) All records of inspections in the distribution system that indicate the material composition of the service connections and connectors that connect a structure to the distribution system.
  - (iv) Water systems must update their inventory annually based on any lead or galvanized requiring replacement service line replacements, service line material inspections, or lead connector replacements that have been conducted. Each updated inventory and subsequent update to the publicly accessible inventory must include the following information regarding service line material identification and replacement:
    - (A) The total number of lead service lines in the inventory;
    - (B) The total number of galvanized requiring replacement service lines in the inventory;
    - (C) The total number of lead status unknown service lines in the inventory;
    - (D) The total number of non-lead service lines in the inventory;
    - (E) The total number of lead connectors in the inventory;
    - (F) The total number of connectors of unknown material in the inventory;
    - (G) The total number of full lead service line replacements and full galvanized requiring replacement service line replacements that have been conducted in each preceding program year as defined in paragraph (d)(5)(iii) of this section; and
    - (H) The total number of partial lead service line replacements and partial galvanized requiring replacement service line replacements that have been conducted in each preceding program year as defined in paragraph (d)(5)(iii) of this section.
  - (v) Water systems must identify service line material in accordance with paragraph (a)(3) of this section, connector material in accordance with paragraph (a)(2) of this section, and addresses in accordance with paragraph (a)(4) of this section as they are encountered in the course of

normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities). Water systems must update the inventory annually based on the identified service line materials, connector materials and addresses.

- (3) Water systems that discover a lead or galvanized requiring replacement service line that was previously inventoried as non-lead must update their inventory in accordance with paragraph (b)(2) of this section and, if applicable, paragraph (b)(1)(ii) of this section. Water systems must notify the State in accordance with § 141.90(e) and comply with any additional actions required by the State to address the inventory inaccuracy.
- (4) If a consumer or customer (if different from the person served at that service connection) notifies the water system of a suspected incorrect categorization of their service line material in the inventory, the system must respond to the consumer or customer within 30 days of receiving the notification to make an offer to inspect the service line.
- (5) All water systems must validate the accuracy of the non-lead service line category in the inventory as follows:
  - (i) The water system must identify a validation pool consisting of all service lines categorized as "non-lead," but excluding non-lead service lines identified by the following: records showing the service line was installed after June 19, 1988, or after the compliance date of a State or local law prohibiting the use of service lines that do not meet the 1986 definition of lead free in accordance with section 1417 of the Safe Drinking Water Act, as amended in 1986 (Pub. L. 99-339, title I, sec. 109(a), 100 Stat. 651) and 40 CFR 141.43(d)(1) and (2), as codified on July 1, 1991, whichever is earlier; visual inspection of the pipe exterior at a minimum of two points (e.g., excavation, visual inspection in the meter pit or stop box, or visual inspection inside the home); or previously replaced lead or galvanized requiring replacement service lines.
  - (ii) The water system must confirm the service line material of a random sample (e.g., a sample selected by use of a random number generator or lottery method) of non-lead service lines from the validation pool. Confirmation of service line material must be done by visual inspection of the pipe exterior at a minimum of two points. Where ownership is shared, the water system must conduct at least one visual inspection on each portion of the service line. Where ownership is shared and only one portion of the service line is included in the validation pool, systems must conduct at least one point of visual inspection on the unconfirmed portion of the service line. Water systems must validate at least as many service lines as are required in table 1 to this paragraph (b)(5)(ii).

**TABLE 1 TO PARAGRAPH (b)(5)(ii)**

Size of validation pool	Number of validations required
<1,500	20 percent of validation pool.
1,500 to 2,000	322.
2,001 to 3,000	341.
3,001 to 4,000	351.

Size of validation pool	Number of validations required
4,001 to 6,000	361.
6,001 to 10,000	371.
10,001 to 50,000	381.
>50,000	384.

- (iii) If physical access to private property is necessary to complete the validation and the water system is unable to gain access, the system is not required to conduct a validation at that site. The system must replace the site by randomly selecting a new service line that meets the requirements of paragraph (b)(5)(i) of this section to conduct the validation.
- (iv) The deadlines for inventory validation are:
  - (A) No later than December 31 following seven years after the compliance date in § 141.80(a)(3) for water systems subject to the mandatory service line replacement deadline in paragraph (d)(4) of this section or water systems who have reported only non-lead service lines in their baseline inventory, submitted to the State in accordance with § 141.90(e)(9);
  - (B) A deadline established by the State for water systems conducting mandatory service line replacement on a shortened deadline for service line replacement as established by the State in accordance with paragraph (d)(5)(v) of this section; or
  - (C) A deadline established by the State to be no later than three years prior to the deadline for completing mandatory service line replacement if the water system is eligible for and plans to use a deferred deadline under paragraph (d)(5)(vi) of this section or an extended schedule for mandatory service line replacement pursuant to an exemption or a variance.
- (v) Water systems that conduct inventory validation pursuant to this paragraph (b)(5) must complete the validation by the applicable deadline described in paragraph (b)(5)(iv) of this section, submit the results of the validation in accordance with § 141.90(e)(9), and comply with any additional actions required by the State to address inventory inaccuracies. The system must submit to the State the specific version (including the date) of the service line inventory that was used to determine the number of non-lead service lines included in the validation pool in accordance with § 141.90(e)(9).
- (vi) Water systems may make a written request to the State to approve a waiver of the inventory validation requirements in this paragraph (b). To obtain a waiver, the water system must submit documentation to the State to demonstrate the system has conducted an inventory validation that is at least as stringent as the inventory validation requirements specified in paragraphs (b)(5)(i) through (iii) of this section by the compliance date in § 141.80(a)(3) and obtain written approval of the waiver from the State.

- (c) **Service line replacement plan.** All water systems with one or more lead, galvanized requiring replacement, or lead status unknown service lines in their distribution system must create a service line replacement plan by the compliance date in § 141.80(a)(3) and submit a service line replacement plan to the State in accordance with § 141.90(e). The service line replacement plan must be sufficiently detailed to ensure a system is able to comply with the service line inventory and replacement requirements in this section.
- (1) The service line replacement plan must include a description of:
- (i) A strategy for determining the material composition of lead status unknown service lines in the service line inventory under paragraph (a) of this section;
  - (ii) A standard operating procedure for conducting full service line replacement (e.g., techniques to replace service lines);
  - (iii) A communication strategy to inform consumers (i.e., persons served at the service connection) and customers before a full or partial lead or galvanized requiring replacement service line replacement consistent with the requirements for notification and mitigation in paragraph (h) of this section;
  - (iv) A procedure for consumers and customers to flush service lines and premise plumbing of particulate lead following disturbance of a lead, galvanized requiring replacement, or lead status unknown service line in accordance with § 141.85(f) and following full or partial replacement of a lead or galvanized requiring replacement service line consistent with the requirements for notification and mitigation in paragraph (h) of this section;
  - (v) A strategy to prioritize service line replacement based on factors including, but not limited to, known lead and galvanized requiring replacement service lines and community-specific factors, such as populations disproportionately impacted by lead and populations most sensitive to the effects of lead;
  - (vi) A funding strategy for conducting service line replacement. Where the water system intends to charge customers for the cost to replace all or a portion of the service line because it is authorized or required to do so under State or local law or water tariff agreement, the funding strategy must include a description of whether and how the water system intends to assist customers who are unable to pay to replace the portion of the service line they own;
  - (vii) A communication strategy to inform residential and non-residential customers and consumers (e.g., property owners, renters, and tenants) served by the water system about the service line replacement plan and program; and
  - (viii) Identification of any laws, regulations, and/or water tariff agreements that affect the water system's ability to gain access to conduct full lead and galvanized requiring replacement service line replacement, including the citation to the specific laws, regulations, or water tariff agreement provisions. This includes identification of any laws, regulations, and/or water tariff agreements that require customer consent and/or require or authorize customer cost-sharing.
  - (ix) For any water system that identifies any lead-lined galvanized service lines in the service line inventory as described in paragraphs (a) and (b) of this section, a strategy to determine the extent of the use of lead-lined galvanized service lines in the distribution system and categorize any lead-lined galvanized service lines as lead pursuant to table 2 to paragraph (d)(6)(iii)(A) of this section.

- (x) For any water system that is eligible for and plans to use a deferred deadline pursuant to paragraph (d)(5)(vi) of this section:
  - (A) Documentation to support the system's determination that it is eligible for a deferred deadline, showing that 10 percent of the total number of known lead and galvanized requiring replacement service lines in the replacement pool exceeds 39 annual replacements per 1,000 service connections as calculated in paragraph (d)(5)(vi)(A) of this section;
  - (B) Identification of the deferred deadline and the associated cumulative average replacement rate that the system considers to be the fastest feasible but no slower than a deadline and replacement rate corresponding to 39 annual replacements per 1,000 service connections as calculated in paragraph (d)(5)(vi)(A) of this section, as well as the annual number of replacements required, the length of time (in years and months), and the date of completion for this deadline and rate; and
  - (C) Information supporting the system's determination that replacing lead and galvanized requiring replacement service lines by an earlier date and faster rate than provided under the deferred deadline provision in paragraph (d)(5)(vi) of this section is not feasible.
- (2) The service line replacement plan must be made accessible to the public. Water systems serving greater than 50,000 persons must make the plan available to the public online.
- (3) Water systems must annually update the service line replacement plan to include any new or updated information and submit the updates to the State on an annual basis in accordance with § 141.90(e). The water system must make the updated plan publicly accessible no later than the deadline to submit the updated plan to the State.
  - (i) If there is no new or updated information to include in the service line replacement plan since the previous iteration, the water system may certify to the State that the plan has no updates in lieu of resubmitting the plan unless the system is replacing service lines in accordance with a deferred deadline and paragraph (c)(3)(ii) of this section applies.
  - (ii) If there is no new or updated information to include in the service line replacement plan and the water system is replacing service lines in accordance with a deferred deadline pursuant to paragraph (d)(5)(vi) of this section, every three years after the initial submission of the plan, the system must update the information specified in paragraph (c)(1)(x) of this section to support why the system continues to need the deferred deadline and resubmit the plan to the State.
  - (iii) If there are no longer lead, galvanized requiring replacement, and unknown service lines in the inventory as described in paragraphs (a) and (b) of this section, water systems are not required to resubmit the service line replacement plan or certify to the State that the plan has no updates.

(d) ***Mandatory full service line replacement.***

- (1) All water systems must replace all lead and galvanized requiring replacement service lines under the control of the water system unless the replacement would leave in place a partial lead service line.
- (2) Where a water system has access (e.g., legal access, physical access) to conduct full service line replacement, the service line is under its control, and the water system must replace the service line. Where a water system does not have access to conduct full service line replacement, the water system is not required by this subpart to replace the line, but the water system must document the

reasons that the water system does not have access and include any specific laws, regulations, and/or water tariff agreements that affect the water system's ability to gain access to conduct full replacement of lead and galvanized requiring replacement service lines. The water system must provide this documentation to the State pursuant to § 141.90(e)(10).

- (i) This subpart does not establish the criteria for determining whether a system has access to conduct full service line replacement. Any applicable State or local laws or water tariff agreement requirements to gain access to conduct full service line replacement must be identified in the service line replacement plan as described in paragraph (c) of this section.
  - (ii) [Reserved]
- (3) Where a water system has legal access to conduct full service line replacement only if property owner consent is obtained, the water system must make a “reasonable effort” to obtain property owner consent. If such a water system does not obtain consent after making a “reasonable effort” to obtain it from any property owner, then the water system is not required by this subpart to replace any portion of the service line at that address unless there is a change in ownership of the property as described in paragraph (d)(3)(ii) of this section. The water system must provide documentation of the reasonable effort to the State pursuant to § 141.90(e)(10).
- (i) A “reasonable effort” must include at least four attempts to engage the property owner using at least two different methods of communication (e.g., in-person conversation, phone call, text message, email, written letter, postcard, or information left at the door such as a door hanger) before the applicable deadline of mandatory service line replacement as described in paragraph (d)(4) of this section. The State may require systems to conduct additional attempts and may require specific outreach methods to be used.
  - (ii) Within six months of any change in ownership of the property, the water system must offer full service line replacement to any new property owner. Systems may use new service initiation or service transfer to a new customer to identify when there is a change in ownership. Within one year of any change in ownership of the property, the system must make a “reasonable effort” to obtain the property owner's consent as described in paragraph (d)(3)(i) of this section. If the water system is unable to obtain consent from the current property owner after making a “reasonable effort” to obtain it, the water system is not required under this subpart to replace the line. This paragraph (d)(3)(ii) continues to apply until all lead and galvanized requiring replacement service lines are replaced.
- (4) The deadline for water systems to replace all lead and galvanized requiring replacement service lines under the control of the water system is no later than 10 program years after the compliance date specified in § 141.80(a)(3) unless the system is subject to a different deadline under paragraphs (d)(5)(v) and (vi) of this section.
- (i) Water systems must start mandatory service line replacement programs no later than the compliance date specified in § 141.80(a)(3).
  - (ii) If a lead or galvanized requiring replacement service line is discovered when the system's inventory is comprised of only non-lead service lines, the system must complete the following requirements:
    - (A) Update the replacement pool calculated under paragraph (d)(6)(i) of this section.

- (B) Conduct a full service line replacement of the affected service line as soon as practicable but no later than 180 days after the date the service line is discovered. Where a system determines that it is not practicable to conduct full service line replacement within 180 days after the date of discovery (e.g., due to freezing ground conditions), the system may request State approval for an extension of no later than one year after the date the service line was discovered to replace the affected service line. The request for an extension must be made no later than 90 days after the date of discovery of the affected service line.
- (5) Water systems must meet a minimum cumulative average annual replacement rate for completing mandatory service line replacement in accordance with this paragraph (d)(5):
  - (i) **Annual replacement rate.** A water system must replace lead and galvanized requiring replacement service lines as described in paragraph (d)(6) of this section at an average annual replacement rate of at least 10 percent calculated across a cumulative period unless the system is subject to a shortened replacement rate or eligible for a deferred replacement rate in accordance with paragraphs (d)(5)(v) and (vi) of this section.
  - (ii) **Cumulative percent of service lines replaced.** To calculate the cumulative percent of service lines replaced, at the end of each mandatory service line replacement “program year” as specified in paragraph (d)(5)(iii) of this section, water systems must divide the total number of lead and galvanized requiring replacement service lines replaced thus far in the program in accordance with paragraph (d)(6)(iii) of this section by the number of service lines within the replacement pool in accordance with paragraph (d)(6)(i) of this section.
  - (iii) **Program year.** The first mandatory service line replacement “program year” is from the compliance date specified in § 141.80(a)(3) to the end of the next calendar year. Every program year thereafter is on a calendar year basis. This paragraph (d)(5)(iii) applies for the purposes of this section.
  - (iv) **Cumulative average replacement rate.** The annual replacement rate in paragraph (d)(5)(i) of this section is assessed annually as a cumulative average. The first cumulative average replacement rate must be assessed at the end of the third program year and is calculated by dividing the cumulative percent of service lines replaced in accordance with paragraph (d)(5)(ii) of this section by the number of completed program years (or three in this case). Annually thereafter, at the end of each program year, systems must assess the cumulative average replacement rate by dividing the most recent cumulative percent of service lines replaced in accordance with paragraph (d)(5)(ii) by the number of completed program years. Except as provided in paragraph (d)(5)(iv)(A) of this section, the cumulative average replacement rate must be 10 percent or greater each program year, and the water system must replace all lead and galvanized requiring replacement service lines under its control by the applicable deadline for completing mandatory service line replacement in accordance with paragraph (d)(4) of this section.
  - (A) A water system is not required by this section to meet the cumulative average replacement rate described in this paragraph (d)(5) where, after the compliance date specified in § 141.80(a)(3), the system has replaced all lead and galvanized requiring replacement service lines in the replacement pool as described in paragraph (d)(6)(i) of this section that are under the control of the system, identified all unknown service lines in the inventory, and documented and submitted to the State the reasons the system currently does not have access to conduct full replacement of the remaining lead and galvanized requiring replacement service lines in the replacement pool in accordance with

paragraphs (d)(2) and (3) of this section. When lead and galvanized requiring replacement service lines come under the control of the system, the water system is required to replace the service lines as described in this paragraph (d). This paragraph (d)(5)(iv)(A) continues to apply until all lead and galvanized requiring replacement service lines are replaced.

(B) [Reserved]

(v) **Shortened deadline and associated replacement rate.** Where the State determines that a shortened replacement deadline is feasible for a water system (e.g., by considering the number of lead and galvanized requiring replacement service lines in a system's inventory), the system must replace service lines by the State-determined deadline and by a faster minimum replacement rate in accordance with paragraph (d)(5)(v)(A) of this section. The State must make this determination in writing and notify the system of its finding. The State must set a shortened deadline at any time throughout a system's replacement program if a State determines a shorter deadline is feasible. This paragraph (d)(5)(v) also applies to systems eligible for a deferred deadline as specified in paragraph (d)(5)(vi) of this section.

(A) Systems must replace lead and galvanized requiring replacement service lines at an average annual replacement rate calculated by dividing 100 by the number of years needed to meet the shortened deadline determined by the State, expressed as a percentage. Systems must comply with the cumulative average replacement rate in accordance with paragraph (d)(5)(iv) of this section, where the first cumulative average replacement rate is assessed at the end of the program year that is at least one year after the shortened deadline determination, as determined by the State, unless the shortened replacement deadline is less than three years. If the system's shortened replacement deadline is less than three years, the cumulative average replacement rate must be assessed on a schedule determined by the State.

(B) [Reserved]

(vi) **Deferred deadlines and associated replacement rates.** A water system may defer service line replacement past the deadline in paragraph (d)(4) of this section if the system meets the following criteria:

(A) If a water system replacing 10 percent of the total number of known lead and galvanized requiring replacement service lines in a system's replacement pool results in an annual number of service line replacements by the water system that exceeds 39 per 1,000 service connections, the system may complete replacement of all lead and galvanized requiring replacement service lines by a deadline that corresponds to the system conducting 39 annual replacements per 1,000 service connections at a cumulative average replacement rate assessed in accordance with paragraph (d)(5)(iv) of this section. This paragraph (d)(5)(vi)(A) is also applicable if a water system with service lines newly under their control, after previously not having control as described in paragraph (d)(5)(iv)(A) of this section, is required to conduct more than 39 annual replacements per 1,000 service connections. The number of annual replacements corresponding to 39 annual replacements per 1,000 service connections can be calculated by multiplying the number of service connections in a system by 0.039. The number of years needed to complete replacement is the total number of known lead and galvanized requiring replacement service lines in a system's replacement pool divided by the calculated number of annual replacements. To calculate the minimum cumulative average



replacement rate, the system must divide 100 by the number of years needed to achieve replacing 39 annual replacements per 1,000 service connections, expressed as a percentage.

- (B) Any water system that is eligible for and plans to use a deferred deadline must include information, in accordance with paragraph (c)(1)(x) of this section, to support the use of a deferred deadline including identifying the deadline and associated cumulative average rate of replacement to meet this deferred deadline in the system's initial service line replacement plan and subsequent updates to the plan in accordance with paragraph (c) of this section. The system must identify an annual replacement rate that is no less than 39 annual replacements per 1,000 service connections.
  - (C) As soon as practicable, but no later than the end of the second program year as defined in paragraph (d)(5)(iii) of this section, and every three years thereafter, the State must determine in writing whether the deferred deadline and associated cumulative average replacement rate the system documented in paragraph (c)(1)(x)(B) of this section are the fastest feasible to conduct mandatory service line replacement and either approve the continued use of this deferred deadline and replacement rate as the fastest feasible for the system, or set a shorter deferred deadline and identify an associated replacement rate to ensure the system is replacing service lines at the fastest feasible rate for the system. The State must consider information that includes, but is not limited to, the system's submissions of the service line inventory and replacement plan in accordance with paragraph (a) through (c) of this section and information collected from other water systems conducting mandatory service line replacement. The State may require the system to provide additional information for the State to consider in its assessment of the continued use of a deferred deadline and the fastest feasible replacement rate.
  - (D) In the first two program years, the system must comply with the annual replacement rate identified in its initial replacement plan (unless the State determines a faster rate is feasible sooner). In subsequent program years, the system must comply with the applicable deferred deadline and associated replacement rate identified in the State's written determination of the deadline and replacement rate in paragraph (d)(5)(vi)(C) of this section.
- (6) Calculation of the replacement pool, the annual number of replacements required, and the number of service lines replaced each year to calculate a system's cumulative average replacement rate described in paragraph (d)(5) of this section are as follows:
- (i) **Replacement pool.** To calculate the replacement pool, systems must add the total number of lead, galvanized requiring replacement, and lead status unknown service lines in the baseline inventory submitted by the compliance date specified in § 141.80(a)(3). The water system must not subtract lead or galvanized requiring replacement service lines from the replacement pool when they are replaced. The water system must not subtract service lines that are not under the control of the system from the replacement pool. At the beginning of each program year, water systems must update the replacement pool according to the counts of specific types of recategorized service lines in the inventory annually thereafter as described in this paragraph (d)(6)(i):
    - (A) Unknown service lines that are identified as non-lead service lines must be subtracted from the replacement pool. Unknown service lines that are identified as lead or galvanized requiring replacement service lines must be recategorized appropriately in the inventory

and replacement pool, but they do not change the number of service lines in the replacement pool because recategorization does not remove these service lines from the replacement pool.

- (B) Non-lead service lines discovered to be lead or galvanized requiring replacement service lines must be added to the replacement pool.
- (C) Lead or galvanized requiring replacement service lines discovered to be non-lead service lines must be subtracted from the replacement pool.
- (D) Each entire service line must count only once for purposes of calculating the replacement pool.

(ii) **Annual number of replacements required.** To calculate the number of lead and galvanized requiring replacement service lines a system is required to replace in a given program year, divide the number of service lines in the most up-to-date replacement pool, calculated at the beginning of each program year, by the total number of years remaining under paragraph (d)(4) of this section to complete mandatory service line replacement (e.g., 10 years).

(iii) **Number of service lines replaced.** When calculating the cumulative average replacement rate, the water system may only include full service line replacements of lead or galvanized requiring replacement service lines when counting the number of service lines replaced. Wherever the system conducts a replacement of a lead or galvanized requiring replacement service line (either a portion of a service line or the entire service line), the replacement counts as a full service line replacement only if, after the replacement, the entire service line can be categorized in the inventory as non-lead under paragraph (a)(3)(iii) of this section.

- (A) For purposes of mandatory service line replacement, systems must count each entire service line once, including where ownership of the service line is shared, with a single material categorization in accordance with table 2 to this paragraph (d)(6)(iii)(A).

**TABLE 2 TO PARAGRAPH (d)(6)(iii)(A)**

System-owned portion	Customer-owned portion	Categorization for entire service line
Lead	Lead	Lead.
Lead	Galvanized Requiring Replacement	Lead.
Lead	Non-lead	Lead.
Lead	Lead Status Unknown	Lead.
Non-lead	Lead	Lead.
Non-lead and never previously lead	Non-lead, specifically galvanized pipe material	Non-lead.
Non-lead	Non-lead, material other than galvanized pipe material	Non-lead.

System-owned portion	Customer-owned portion	Categorization for entire service line
Non-lead	Lead Status Unknown	Lead Status Unknown.
Non-lead, but system is unable to demonstrate it was not previously Lead	Galvanized Requiring Replacement	Galvanized Requiring Replacement.
Lead Status Unknown	Lead	Lead.
Lead Status Unknown	Galvanized Requiring Replacement	Galvanized Requiring Replacement.
Lead Status Unknown	Non-lead	Lead Status Unknown.
Lead Status Unknown	Lead Status Unknown	Lead Status Unknown.

- (B) A full service line replacement is counted where a non-lead service line is installed for use and the lead or galvanized requiring replacement service line is disconnected from the water main or other service line. If the lead or galvanized requiring replacement service line is disconnected from the water main or system-owned portion of the service line but not removed, the water system must be subject to a State or local law or have a written policy to preclude the water system from reconnecting the lead or galvanized requiring replacement service line to the water main or other service line.
- (C) A full service line replacement may be counted where a system physically disconnects a service line that is not in use and the water system does not install a new non-lead service line because there is no service line in use (e.g., at an abandoned property). If the disconnected lead or galvanized requiring replacement service line is not removed, the water system must be subject to a State or local law or have a written policy to preclude the water system from reconnecting the disconnected service line (i.e., a new non-lead service line must be installed if active use is to resume).
- (D) Water systems must not count the following as a full service line replacement for purposes of this subpart:
- (1) Where the service line is partially replaced as defined in § 141.2.
  - (2) Where a lead, galvanized requiring replacement, or unknown service line is determined to be a non-lead service line.
  - (3) Where only a lead connector is replaced.
  - (4) Where pipe lining or coating technologies are used while the lead or galvanized requiring replacement service line remains in use.

- (5) Where a water system does not replace a lead or galvanized requiring replacement service line because it is not be under the control of the system as described in paragraph (d)(2) of this section.

(e) ***Replacement of lead connectors when encountered by a water system.***

- (1) The water system must replace any lead connector when encountered during planned or unplanned water system infrastructure work unless the connector is not under the control of the system (e.g., where the system does not have and cannot obtain access to conduct the connector replacement).
  - (i) Upon replacement of any connector that is attached to a lead or galvanized requiring replacement service line, the water system must follow risk mitigation measures for disturbances as specified in § 141.85(f)(2).
  - (ii) Following replacement of a lead connector, the water system must update the information on the connector material and location in its inventory in accordance with paragraphs (a)(2)(ii) and (b)(2) of this section.
- (2) The water system must comply with any State or local laws that require additional connectors to be replaced.

(f) ***Replacement of a service line prompted by the customer.*** If State or local laws or water tariff agreements do not prevent customers from conducting partial lead or galvanized requiring replacement service line replacements ("customer-initiated replacements"), the water system must meet the following requirements:

- (1) If the water system is notified by the customer that the customer intends to conduct a partial lead or galvanized requiring replacement service line replacement, the water system must:
  - (i) Replace the remaining portion of the lead or galvanized requiring replacement service line at the same time as, or as soon as practicable after, the customer-initiated replacement, but no later than 45 days from the date the customer conducted the partial replacement;
  - (ii) Provide notification and risk mitigation measures in accordance with paragraph (h) of this section, as applicable, before the affected service line is returned to service; and
  - (iii) Notify the State within 30 days if it cannot meet the deadline in paragraph (f)(1)(i) of this section and complete the replacement no later than 180 days from the date the customer conducted the partial replacement.
- (2) If the water system is notified or otherwise learns that a customer-initiated replacement occurred within the previous six months and left in place the system-owned portion of a lead or galvanized requiring replacement service line, the water system must:
  - (i) Replace any remaining portion of the affected service line within 45 days from the day of becoming aware of the customer-initiated replacement; and
  - (ii) Provide notification and risk mitigation measures in accordance with paragraph (h) of this section within 24 hours of becoming aware of the customer replacement.
  - (iii) Notify the State within 30 days if it cannot meet the deadline in paragraph (f)(2)(i) of this section and complete the replacement no later than 180 days of the date the system learns of the customer-initiated replacement.

(3) When a water system is notified or otherwise learns of a customer-initiated replacement of a lead or galvanized requiring replacement service line that occurred more than six months in the past, this section does not require the water system to complete the lead or galvanized requiring replacement service line replacement of the system-owned portion under this paragraph (f). However, the remaining portion of the lead or galvanized requiring replacement service line must be identified in the inventory in accordance with paragraph (b) of this section and replaced in accordance with paragraph (d) of this section.

(g) **Requirements for conducting partial service line replacements.** This paragraph (g) prohibits water systems from conducting a partial lead service line replacement or a partial galvanized requiring replacement service line replacement as defined under § 141.2 unless it is conducted as part of an emergency repair or in coordination with planned infrastructure work that impacts service lines, excluding planned infrastructure work solely for the purposes of lead or galvanized requiring replacement service line replacement. Where a water system has access to conduct full service line replacement as specified in paragraph (d)(2) of this section, the water system must fully replace the service line. Where a water system conducts partial service line replacement, the system must comply with the notification and mitigation requirements specified in paragraphs (h)(1) and (2) of this section.

(1) Whenever a water system conducts a partial replacement of a lead or galvanized requiring replacement service line, the system must include a dielectric coupling separating the remaining service line and the replaced service line (i.e., newly installed service line) to prevent galvanic corrosion unless the replaced service line is made of plastic.

(2) [Reserved]

(h) **Protocols for notification and mitigation for partial and full service line replacements –**

(1) **Notification and mitigation requirements for planned partial service line replacement.** Whenever a water system plans to partially replace a lead or galvanized requiring replacement service line in coordination with planned infrastructure work that impacts service lines, the water system must provide written notice to the property owner, or the owner's authorized agent, as well as non-owner occupant(s) served by the affected service line at least 45 days prior to the replacement. Where a water system has access to conduct full service line replacement only if property owner consent is obtained, the water system must make a reasonable effort to obtain property owner consent to replace the remaining portion of the service line in accordance with paragraph (d)(3)(i) of this section. The reasonable effort must be completed before the partial lead service line replacement.

(i) Before the affected service line is returned to service, the water system must provide written notification that explains that consumers may experience a temporary increase of lead levels in their drinking water due to the replacement and that meets the content requirements of § 141.85(a)(1)(ii) through (iv) and contact information for the water system. In instances where multi-family dwellings or multiple non-residential occupants are served by the affected service line to be partially replaced, the water system may elect to post the information at a conspicuous location instead of providing individual written notification to all residents or non-residential occupants.

(ii) Before the affected service line is returned to service, the water system must provide written information about a procedure for consumers to flush service lines and premise plumbing of particulate lead following partial replacement of a lead or galvanized requiring replacement service line.

- (iii) Before the affected service line is returned to service, the water system must provide the consumer with a pitcher filter or point-of-use device certified by an American National Standards Institute accredited certifier to reduce lead, six months of replacement cartridges, and instructions for use. If the affected service line serves more than one residence or non-residential unit (e.g., a multi-unit building), the water system must provide a pitcher filter or point-of-use device, six months of replacement cartridges and use instructions to every residential and non-residential unit in the building.
  - (iv) The water system must offer to the consumer to collect a follow up tap sample between three months and six months after the completion of any partial replacement of a lead service line. The tap sample must be a first- and fifth-liter paired sample after at least six hours of stagnation, following the tap sampling protocol under § 141.86(b). The water system must provide the results of the sample to the persons served by the service line in accordance with § 141.85(d).
- (2) **Notification and mitigation requirements for emergency partial service line replacement.** Any water system that creates a partial replacement of a lead or galvanized requiring replacement service line due to an emergency repair must provide notice and risk mitigation measures to the persons served by the affected service line in accordance with paragraphs (h)(1)(i) through (iv) of this section before the affected service line is returned to service. The water system must offer to the property owner, or the owner's authorized agent, to replace the partial service line created by the emergency repair within 45 days.
- (3) **Notification and mitigation requirements for full service line replacement.** Any water system that conducts a full lead or galvanized requiring replacement service line replacement must provide written notice to the persons served by the affected service line before the affected service line is returned to service; written notice must be provided to the owner or the owner's authorized agent, no later than 30 days following completion of the replacement.
  - (i) The written notification must explain that consumers may experience a temporary increase of lead levels in their drinking water due to the replacement and must meet the content requirements of § 141.85(a)(1)(ii) through (iv) as well as contact information for the water system. In instances where multi-family dwellings or multiple non-residential occupants are served by the lead or galvanized requiring replacement service line to be replaced, the water system may elect to post the information at a conspicuous location instead of providing individual written notification to all persons served in residential and non-residential units.
  - (ii) Before the replaced service line is returned to service, the water system must provide written information about a procedure for consumers to flush service lines and premise plumbing of particulate lead following full replacement of a lead or galvanized requiring replacement service line.
  - (iii) Before the replaced service line is returned to service, the water system must provide the consumer with a pitcher filter or point-of-use device certified by an American National Standards Institute accredited certifier to reduce lead, six months of replacement cartridges, and instructions for use. If the lead service line serves more than one residence or non-residential unit (e.g., a multi-unit building), the water system must provide a pitcher filter or point-of-use device, six months of replacement cartridges and instructions for use to every residential and non-residential unit in the building.

(iv) The water system must offer to the consumer to collect a follow up tap sample between three months and six months after completion of any full replacement of a lead or galvanized requiring replacement service line. The tap sample must be a first-liter sample after at least six hours of stagnation, following the tap sampling protocol under § 141.86(b). The water system must provide the results of the sample to the consumer in accordance with § 141.85(d).

(i) **Reporting to demonstrate compliance to the State.** To demonstrate compliance with paragraphs (a) through (h) of this section, a water system must report to the State the information specified in § 141.90(e).

[89 FR 86634, Oct. 30, 2024]

## § 141.85 Public education and supplemental monitoring and mitigation requirements.

A water system that exceeds the lead action level based on tap water samples collected in accordance with § 141.86 must distribute the public education materials contained in paragraph (a) of this section in accordance with the delivery requirements in paragraph (b) of this section. Water systems that exceed the lead action level must offer to sample the tap water of any person served by the water system who requests it in accordance with paragraph (c) of this section. Water systems must offer to sample for lead in the tap water of any person served by a lead, galvanized requiring replacement, or lead status unknown service line who requests it in accordance with paragraph (c) of this section. All water systems must deliver a consumer notice of lead tap water monitoring results and copper tap water monitoring results to persons served by the water system at sites that are sampled, as specified in paragraph (d) of this section. A water system with lead, galvanized requiring replacement, or lead status unknown service lines must deliver public education materials to persons with a lead, galvanized requiring replacement, or lead status unknown service line as specified in paragraphs (e) and (f) of this section. All community water systems that do not meet the minimum replacement rate for mandatory service line replacement as required under § 141.84(d) must conduct outreach activities as specified in paragraph (h) of this section. All community water systems must conduct annual outreach to local and State health agencies as outlined in paragraph (i) of this section. Water systems with multiple lead action level exceedances, as specified in paragraph (j)(1) of this section, must conduct public outreach and make filters certified to reduce lead available as specified in paragraphs (j)(2) through (6) of this section. For water systems serving a large proportion of consumers with limited English proficiency, as determined by the State, all public education materials required under this section must comply with the language requirements in paragraph (b)(1) of this section.

(a) **Content of written public education materials –**

(1) **Community water systems and non-transient non-community water systems.** Water systems must include the following elements in written materials (e.g., printed or digital brochures and pamphlets) in the same order as listed in paragraphs (a)(1)(i) through (vii) of this section. In addition, language in paragraphs (a)(1)(i), (ii), and (vii) of this section must be included in the materials, exactly as written, except for the text in brackets for which the water system must include system-specific information. States may approve changes to the content requirements if the State determines the changes are more protective of human health. Any additional information presented by a water system must be consistent with the information in paragraphs (a)(1)(i) through (vii) of this section and be in plain language that can be understood by the general public. Water systems must submit a copy of all written public education materials to the State prior to delivery. The State may require the system to obtain approval of the content of written public education materials prior to delivery.

(i) **Important information about lead in your drinking water.**

## Figure 1 to Paragraph (a)(1)(i)

### Important Information About Lead in Your Drinking Water

[INSERT NAME OF WATER SYSTEM] found elevated levels of lead in drinking water in some homes/buildings. Lead can cause serious health problems, especially for pregnant people and young children. Please read this information closely to see what you can do to reduce lead in your drinking water.

**(ii) *Health effects of lead.***

## Figure 2 to Paragraph (a)(1)(ii)

There is no safe level of lead in drinking water. Exposure to lead in drinking water can cause serious health effects in all age groups, especially pregnant people, infants (both formula-fed and breastfed), and young children. Some of the health effects to infants and children include decreases in IQ and attention span. Lead exposure can also result in new or worsened learning and behavior problems. The children of persons who are exposed to lead before or during pregnancy may be at increased risk of these harmful health effects. Adults have increased risks of heart disease, high blood pressure, kidney or nervous system problems. Contact your health care provider for more information about your risks.

**(iii) *Sources of lead.***

**(A)** Explain what lead is.

**(B)** Explain possible sources of lead in drinking water and how lead enters drinking water. Include information on home/building plumbing materials, service lines, and connectors that may contain lead and include information about the definition of lead free as provided in Safe Drinking Water Act section 1417 of 1986 and as subsequently revised in 2011. Explain that lead levels may vary and therefore lead exposure is possible even when tap sampling results do not detect lead at one point in time.

**(C)** Discuss other important sources of lead exposure in addition to drinking water (e.g., paint).

**(iv) *Consumer steps to reduce lead exposure.*** Discuss the steps the consumer can take to reduce their exposure to lead in drinking water.

**(A)** Explain that using a filter, certified by an American National Standards Institute accredited certifier to reduce lead, is effective in reducing lead exposures. If the system makes filters available in accordance with paragraph (j)(2) of this section, also include information on how the consumer can obtain a filter.

**(B)** Encourage running the water to flush out the lead. Explain that lead levels increase over time as water sits in lead-containing plumbing materials and regular water usage in the building can reduce lead levels in drinking water. Advise consumers served by lead and galvanized requiring replacement service lines that they may need to flush the water for longer periods.



- (C) Explain concerns with using hot water from the tap and specifically caution against the use of hot water for preparing baby formula.
- (D) Explain that boiling water does not reduce lead levels.
- (E) Encourage regular cleaning of faucet aerators.
- (F) Discuss other steps consumers can take to reduce exposure to lead in drinking water, especially for pregnant persons, infants, and young children, such as using alternative sources of water.
- (G) Suggest that parents have their child's blood tested for lead. Provide contact information for the State and/or local health department.
- (H) Tell consumers how to get their water tested, including information in accordance with paragraph (c) of this section.
- (v) **Levels of lead in drinking water.** Explain why there are elevated levels of lead in the system's drinking water (if known) and what the water system is doing to reduce the lead levels in homes/buildings in this area.
- (vi) **Information on lead, galvanized requiring replacement, and unknown service lines.** For systems with lead, galvanized requiring replacement, or lead status unknown service lines in the system's inventory pursuant to § 141.84(a) and (b), public education materials must meet the requirements of paragraphs (a)(1)(vi)(A) through (G) of this section. For systems with lead connectors or connectors of unknown material in the system's inventory pursuant to § 141.84(a) and (b), public education materials must meet the requirements of paragraph (a)(1)(vi)(C) of this section:
  - (A) Discuss opportunities to replace lead and galvanized requiring replacement service lines;
  - (B) Discuss opportunities to have the material of a lead status unknown service line identified;
  - (C) Include information on how to obtain a copy of the service line inventory or view the inventory on the internet if the system is required to make the inventory available online so the consumer can find out if they are served by a lead, galvanized requiring replacement, or lead status unknown service line, or known lead connector or connector of unknown material;
  - (D) Include information on how to obtain a copy of the service line replacement plan or view the plan on the internet if the system is required to make the service line replacement plan available online;
  - (E) Include information about opportunities to replace lead and galvanized requiring replacement service lines. Where the water system intends for customer payment for a portion of the replacement where it is required or authorized by State or local law or a water tariff agreement, the notice must include information about programs that provide financing solutions to assist property owners with replacement of their portion of a lead or galvanized requiring replacement service line;
  - (F) Include a statement that the water system is required to replace its portion of a lead or galvanized requiring replacement service line when the property owner notifies the water system that they are replacing their portion of the lead or galvanized requiring replacement service line; and

- (G) Include a statement that provides instructions for the customer or consumer to notify the water system if they disagree with the service line material categorization in the inventory.

(vii) *More information about lead.*

### Figure 3 to Paragraph (a)(1)(vii)

For more information, contact [INSERT NAME OF WATER SYSTEM] at [INSERT WATER SYSTEM PHONE NUMBER OR EMAIL ADDRESS] [(IF APPLICABLE), or visit our website at [INSERT WATER SYSTEM WEBSITE]. For more information on reducing lead exposure around your home/building and the health effects of lead, visit EPA's website at <https://www.epa.gov/lead> or contact your health care provider.

(2) [Reserved]

(b) *Timing, format, and delivery method of public education materials.*

- (1) For water systems serving a large proportion of consumers with limited English proficiency, as determined by the State, all public education materials required under this section must contain information in the appropriate language(s) regarding the importance of the materials and either contain information on where such consumers may obtain a translated copy of the public education materials, or assistance in the appropriate language(s), or the materials must be in the appropriate language(s).
- (2) Each time a community water system exceeds the lead action level based on tap water samples collected in accordance with § 141.86, the system must conduct the public education tasks under this paragraph (b)(2) within 60 days after the end of the tap sampling period in which the exceedance occurred. For community water systems that are on standard monitoring, the end of the tap sampling period is June 30 or December 31. For community water systems that are required to conduct monitoring annually or less frequently, the end of the tap sampling period is September 30 of the calendar year in which the sampling occurs, or, if the State has established an alternate four-month tap sampling period, the last day of that period.
  - (i) Deliver written materials meeting the content requirements of paragraph (a) of this section to each customer receiving a bill and to other service connections to which water is delivered by the water system. In the case of multi-family dwellings, the water system must deliver the written materials to each unit or post the information at a conspicuous location.
  - (ii)
    - (A) Contact consumers who are most at risk by delivering education materials that meet the content requirements of paragraph (a) of this section to local public health agencies even if they are not located within the water system's service area, along with an informational notice that encourages distribution to all of the agencies' potentially affected customers or community water system's users. The water system must contact the local public health agencies directly by phone, email, or in person. If local public health agencies provide a specific list of additional community-based organizations serving populations at greatest risk from lead exposure (e.g., pregnant people, children), including organizations outside the service area of the water system, then the system must deliver education materials that meet the content requirements of paragraph (a) to all organizations on the provided lists.

- (B) Contact consumers who are most at risk by delivering materials that meet the content requirements of paragraph (a) of this section to the following organizations listed in paragraphs (b)(2)(ii)(B)(1) through (7) of this section that are located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users:
  - (1) Schools, child care facilities, and school boards.
  - (2) Women, Infants and Children (WIC) and Head Start programs.
  - (3) Public and private hospitals and medical clinics.
  - (4) Pediatricians.
  - (5) Family planning clinics.
  - (6) Local welfare agencies.
  - (7) Obstetricians-gynecologists and midwives.
- (iii) No less often than quarterly, provide information with each water bill as long as the system exceeds the action level for lead. The message on the water bill must include the statement in figure 4 to this paragraph (b)(2)(iii) exactly as written except for the text in brackets for which the water system must include system-specific information. The message or delivery mechanism can be modified in consultation with the State; specifically, the State may allow a separate mailing of public education materials to customers if the water system cannot place the information on water bills.

#### Figure 4 to Paragraph (b)(2)(iii)

[INSERT NAME OF WATER SYSTEM] found elevated levels of lead in drinking water in some homes/buildings. Lead can cause serious health problems. For more information please contact [INSERT NAME OF WATER SYSTEM] [or visit (INSERT WATER SYSTEM WEBSITE)].

- (iv) Post material meeting the content requirements of paragraph (a) of this section on the water system's website if the system serves a population greater than 50,000. The system must retain material on the website for as long as the system exceeds the action level.
- (v) Submit a press release to media outlets including newspaper, television, and radio stations. The submitted press release must state the water system found elevated levels of lead in drinking water in some homes/buildings and meet the content requirements of paragraph (a) of this section.
- (vi) Implement at least three additional activities from one or more categories listed in paragraphs (b)(2)(vi)(A) through (J) of this section. The educational content and selection of these activities must be determined in consultation with the State.
  - (A) Public service announcements.
  - (B) Paid advertisements.
  - (C) Public area information displays.
  - (D) Emails to customers.

- (E) Public meetings.
  - (F) Household deliveries.
  - (G) Targeted individual customer contact.
  - (H) Direct material distribution to all multi-family homes and institutions.
  - (I) Contact organizations representing plumbers and contractors to provide information about lead in drinking water, sources of lead, and the importance of using lead free plumbing materials.
  - (J) Other methods approved by the State.
- (vii) [Reserved]
- (3) A community water system must repeat the activities in paragraph (b)(2) of this section until the system is at or below the lead action level based on tap water samples collected in accordance with § 141.86. These repeated activities must be completed within 60 days of the end of each tap sampling period. A calculated 90th percentile level at or below the lead action level based on fewer than the minimum number of required samples under § 141.86 cannot be used to meet the requirements of this paragraph (b)(3).
- (4) Within 60 days after the end of each tap sampling period in which a lead action level exceedance occurs, a non-transient non-community water system must deliver the public education materials specified by paragraph (a) of this section as follows:
- (i) Post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the system until the system is at or below the lead action level based on tap water samples collected in accordance with § 141.86; and
  - (ii) Distribute informational pamphlets and/or brochures on lead in drinking water to each person served by the non-transient non-community water system. The State may allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as it achieves at least the same coverage.
  - (iii) For systems that are on standard monitoring, the end of the tap sampling period is June 30 or December 31. For systems that are required to conduct monitoring annually or less frequently, the end of the tap sampling period is September 30 of the calendar year in which the sampling occurs, or, if the State has established an alternate tap sampling period, the last day of that period.
- (5) A non-transient non-community water system must repeat the tasks contained in paragraph (b)(4) of this section until the system is at or below the lead action level based on tap water samples collected in accordance with § 141.86. These repeated activities must be completed within 60 days of the end of each tap sampling period. A calculated 90th percentile level at or below the lead action level based on fewer than the minimum number of required samples under § 141.86 cannot be used to meet the requirements of this provision.
- (6) A water system may discontinue delivery of public education materials if the system is at or below the lead action level during the most recent six-month tap sampling period conducted pursuant to § 141.86. Such a system must recommence public education in accordance with this section if it subsequently exceeds the lead action level during any tap sampling period.

- (7) A water system may request an extension from the State, in writing, to complete the activities in paragraphs (b)(2)(ii) through (vi) of this section for community water systems, or paragraphs (b)(4)(i) and (ii) of this section for non-transient non-community water systems, as follows:
  - (i) The extension must be approved in writing by the State before the 60-day deadline;
  - (ii) The State may only grant the extension on a case-by-case basis if the system has demonstrated that it is not feasible to complete the activities in paragraphs (b)(2)(ii) through (vi) of this section for community water systems, or paragraphs (b)(4)(i) and (ii) of this section for non-transient non-community water systems; and
  - (iii) The activities in paragraph (b)(2) or (4) of this section must be completed no later than six months after the end of the tap sampling period in which the exceedance occurred.
- (8) A community water system meeting the criteria of paragraphs (b)(8)(i) and (ii) of this section may apply to the State, in writing (unless the State has waived the requirement for prior State approval), to perform the tasks listed in paragraphs (b)(4) and (5) of this section in lieu of the tasks in paragraphs (b)(2) and (3) of this section if:
  - (i) The system is a facility, such as a prison or a hospital, where the population served is not capable of or is prevented from making improvements to plumbing or installing point-of-use treatment devices; and
  - (ii) The system provides water as part of the cost of services provided and does not separately charge for water consumption.
- (9) A community water system serving 3,300 or fewer persons may limit certain aspects of their public education programs as follows:
  - (i) With respect to the requirements of paragraph (b)(2)(ii) of this section, a system serving 3,300 or fewer persons may limit the distribution of the public education materials required under paragraph (b)(2)(ii) to facilities and organizations served by the system that are most likely to be visited regularly by pregnant people and children.
  - (ii) With respect to the requirements of paragraph (b)(2)(v) of this section, the State may waive this requirement for systems serving 3,300 or fewer persons as long as the system distributes notices to every household served by the system.
  - (iii) With respect to the requirements of paragraph (b)(2)(vi) of this section, a system serving 3,300 or fewer persons must implement at least one of the activities listed in paragraph (b)(2)(vi).

(c) ***Supplemental monitoring and notification of results.***

- (1) A water system that exceeds the lead action level based on tap samples collected in accordance with § 141.86 must offer to sample for lead in the tap water of any person served by the water system who requests it. At sites served by a lead, galvanized requiring replacement, or lead status unknown service line, the samples must capture both water in contact with premise plumbing and water in contact with the service line (e.g., first- and fifth-liter samples).
- (2) Water systems must offer to sample for lead in the tap water of any person served by a lead, galvanized requiring replacement, or lead status unknown service line who requests it, regardless of whether the water system exceeds the lead action level. The samples must capture both water in contact with premise plumbing and water in contact with the service line (e.g., first- and fifth-liter samples).

- (3) All water systems must provide a consumer notice of the individual tap results from supplemental tap water monitoring carried out under the requirements of this paragraph (c) to the persons served by the water system at the specific sampling site from which the sample was taken (e.g., the occupants of the building where the tap was sampled). Water systems must provide the consumer notice in accordance with the requirements of paragraphs (d)(2) through (4) of this section.

(d) **Notification of results –**

- (1) **Notice requirement.** All water systems must provide a consumer notice of the individual tap results from any lead and copper tap water monitoring carried out under the requirements of § 141.86 to the persons served by the water system at the specific sampling site from which the sample was taken (e.g., the occupants of the building where the tap was sampled).
- (2) **Timing of notification.** A water system must provide the consumer notice as soon as practicable but no later than three business days after the water system learns of the tap monitoring results. Notification by mail must be postmarked within three business days of the system learning of the tap monitoring results.
- (3) **Content.**
  - (i) The consumer notice for lead must include the results of lead tap water monitoring for the tap that was tested, an explanation of the health effects of lead that meets the requirements of paragraph (a)(1)(ii) of this section, information on possible sources of lead in drinking water that meets the requirements of paragraph (a)(1)(iii)(B) of this section, a list of steps consumers can take to reduce exposure to lead in drinking water that meets the requirements of paragraph (a)(1)(iv) of this section, and contact information for the water system. The notice must also provide the maximum contaminant level goal and the action level for lead and the definitions for these two terms from § 141.153(c).
  - (ii) The consumer notice for copper must include the results of copper tap water monitoring for the tap that was tested, an explanation of the health effects of copper as provided in appendix B to subpart Q of this part, a list of steps consumers can take to reduce exposure to copper in drinking water, and contact information for the water system. The notice must also provide the maximum contaminant level goal and the action level for copper and the definitions for these two terms from § 141.153(c).
- (4) **Delivery.** Water systems must provide consumer notice to persons served at the tap that was sampled. The notice must be provided electronically (e.g., email or text message), by phone call or voice message, hand delivery, by mail, or another method approved by the State. For example, upon approval by the State, a non-transient non-community water system could post the results in a conspicuous area, such as on a bulletin board, in the facility to allow users to review the information. Water systems that choose to deliver the notice to consumers by phone call or voice message must follow up with a written notice to consumers hand delivered or postmarked within 30 days of the water system learning of the tap monitoring results. The notices of lead and copper tap sampling results may be combined in one notice.

(e) **Notification of service line that is known to or may potentially contain lead –**

- (1) **Notification requirements.** All water systems with lead, galvanized requiring replacement, or lead status unknown service lines in their inventory pursuant to § 141.84(a) and (b) must provide notification of a service line that is known to or may potentially contain lead to customers and all persons served by the water system at the service connection with a lead, galvanized requiring replacement, or lead status unknown service line.
- (2) **Timing of notification.** A water system must provide notification no later than 30 days after completion of the baseline inventory required under § 141.84(a)(2) and repeat the notification no later than 30 days after the deadline for each annual update to the service line inventory under § 141.90(e)(4) until the entire service connection is no longer a lead, galvanized requiring replacement, or lead status unknown service line. For notifications to new customers, water systems must provide the notice at the time of service initiation.
- (3) **Content —**
  - (i) **Persons served by a confirmed lead service line or galvanized requiring replacement service line.** The notice must include:
    - (A) A statement that the person's service line is lead or galvanized requiring replacement as applicable.
    - (B) An explanation of the health effects of lead that meets the requirements of paragraph (a)(1)(ii) of this section.
    - (C) Steps persons at the service connection can take to reduce exposure to lead in drinking water that meet the requirements of paragraph (a)(1)(iv) of this section.
    - (D) A statement that the consumer can request to have their tap water sampled in accordance with paragraph (c) of this section.
    - (E) Include information on how to obtain a copy of the service line replacement plan or view the plan on the internet if the system is required to make the service line replacement plan available online.
    - (F) Information about opportunities to replace lead and galvanized requiring replacement service lines. Where the water system intends for customer payment for a portion of the replacement where it is required or authorized by State or local law or a water tariff agreement, the notice must include information about programs that provide financing solutions to assist property owners with replacement of their portion of a lead or galvanized requiring replacement service line.
    - (G) A statement that the water system is required to replace its portion of a lead or galvanized requiring replacement service line when the property owner notifies the water system that they are replacing their portion of the lead or galvanized requiring replacement service line.
    - (H) A statement that provides instructions for the customer to notify the water system if they disagree with the service line material categorization in the inventory.
  - (ii) **Persons served by a lead status unknown service line.** The notice must include a statement that the person's service line material is unknown but may be lead, the information in paragraphs (e)(3)(i)(B) through (E) of this section, and information about opportunities to verify the material of the service line.

(4) **Delivery.** The notice must be provided to customers and persons served by the water system at the service connection with a lead, galvanized requiring replacement, or lead status unknown service line, by mail or by another method approved by the State.

(f) **Notification due to a disturbance to a service line that is known to or may potentially contain lead.**

(1) Water systems that cause disturbance to a lead, galvanized requiring replacement, or lead status unknown service line must provide customers and the persons served by the water system at the service connection with information about the potential for elevated lead levels in drinking water as a result of the disturbance. Actions taken by a water system that cause a disturbance include actions that result in a shut off or bypass of water to an individual service line or a group of service lines (e.g., operating a valve on a service line or meter setter, or reconnecting a service line to the main) or other actions that cause a disturbance to a service line or group of service lines, such as undergoing physical action or vibration, that could result in pipe scale dislodging and associated release of particulate lead. The provided information must include:

(i) Public education materials that meet the content requirements in paragraphs (a)(1)(ii) through (iv) and (vi) of this section and contact information for the water system; and

(ii) Instructions for a flushing procedure to remove particulate lead.

(2) If the disturbance of a lead, galvanized requiring replacement, or lead status unknown service line results from the replacement of an inline water meter, a water meter setter, or connector, or from the replacement of a water main whereby the service line pipe is physically cut, the water system must provide the persons served by the water system at the service connection with the information in paragraphs (f)(1)(i) and (ii) of this section and a pitcher filter or point-of-use device certified by an American National Standards Institute accredited certifier to reduce lead, instructions to use the filter, and six months of filter replacement cartridges.

(3)

(i) **Persons at the service connection.** The water system must comply with the requirements in this paragraph (f) for persons served by the water system at the service connection before any service line that has been shut off or bypassed is returned to service. Where there was a disturbance, but service was not shut off or bypassed, the water system must comply with the requirements in this paragraph (f) as soon as possible, but not to exceed 24 hours following the disturbance.

(ii) **Customers.** The water system must comply with the requirements in paragraph (f)(1) of this section for customers associated with the service connection who are not persons served by the water system at the service connection (e.g., a customer who is a property owner and renting their property) no later than 30 days following the disturbance.

(4) A water system that conducts a partial or full replacement of a lead or galvanized requiring replacement service line must follow procedures in accordance with the requirements in § 141.84(h). Partial or full replacement of a lead or galvanized requiring replacement service line is not considered a “disturbance” for purposes of this paragraph (f).

(g) [Reserved]

(h) **Outreach activities to encourage participation in full service line replacement.**



- (1) Community water systems that do not meet the service line replacement rate calculated across a cumulative period as required under § 141.84(d)(5) must conduct at least one outreach activity listed in paragraph (h)(2) of this section to discuss their mandatory service line replacement program and opportunities for replacement and to distribute public education materials that meet the content requirements in paragraph (a) of this section except paragraphs (a)(1)(i) and (v) of this section. The water system must conduct the activity in the year following the program year for which the system does not meet their cumulative average replacement rate and annually thereafter until the water system meets the cumulative average replacement rate or until there are no lead, galvanized requiring replacement, or lead status unknown service lines remaining in the inventory, whichever occurs first.
- (2) For community water systems serving more than 3,300 persons, the outreach activity must be one of the activities identified in paragraphs (h)(2)(i) through (iv) of this section or the water system must conduct two activities listed in paragraphs (h)(2)(v) through (viii) of this section. For community water systems serving 3,300 persons or fewer, the outreach activity must be one of the activities identified in paragraphs (h)(2)(i) through (viii) of this section.
  - (i) Conduct a public meeting.
  - (ii) Participate in a community event to provide information about its service line replacement program.
  - (iii) Contact customers by phone call or voice message, text message, email, or door hanger.
  - (iv) Use another method approved by the State to discuss the service line replacement program and opportunities for lead and galvanized requiring replacement service line replacement.
  - (v) Send certified mail to customers and all persons served by the water system at the service connection with a lead or galvanized requiring replacement service line to inform them about the water system's service line replacement program and opportunities for replacement of the service line.
  - (vi) Conduct a social media campaign.
  - (vii) Conduct outreach via the media including newspaper, television, or radio.
  - (viii) Visit targeted customers (e.g., customers in areas with lower service line replacement participation rates) to discuss the service line replacement program and opportunities for replacement.

(i) **Public education to local and State health agencies —**

- (1) **Distribution System and Site Assessment results.** All community water systems must provide information to local and State health agencies about Distribution System and Site Assessment activities conducted in accordance with § 141.82(j) including the location of the tap sample site that exceeded 0.010 mg/L, the result of the initial tap sample, the result of the follow up tap sample, the result of water quality parameter monitoring, and any distribution system management actions or corrosion control treatment adjustments made.
- (2) **Timing and content.** Community water systems must annually send Distribution System and Site Assessment information and copies of the public education materials provided under paragraphs (a) and (h) of this section for actions conducted in the previous calendar year no later than July 1 of the following year.

- (3) **Delivery.** Community water systems must send public education materials and Distribution System and Site Assessment information to local and State health agencies by mail, email, or by another method approved by the State.

(j) **Additional requirements for water systems with multiple lead action level exceedances.**

- (1) A water system that exceeds the lead action level at least three times in a rolling five-year period, based on tap water samples collected in accordance with § 141.86, must conduct the activities in this section. The first rolling five-year period begins on the compliance date in § 141.80(a)(3). If a water system exceeds the lead action level at least three times within a five-year period, the system must conduct these actions upon the third action level exceedance even if the rolling five-year period has not elapsed.
- (2) No later than 60 days after the tap sampling period in which a water system meets the criteria of paragraph (j)(1) of this section, a water system must make available to all consumers pitcher filters or point-of-use devices certified by an American National Standards Institute accredited certifier to reduce lead, six months of replacement cartridges, and instructions for use. A water system must continue to make replacement cartridges available until the system may discontinue actions in accordance with paragraph (j)(6) of this section.
- (3) No later than 60 days after a water system exceeds the lead action level for the second time in a rolling five-year period, the water system must submit a filter plan to the State. The State must review and approve the filter plan within 60 days. If the water system subsequently meets the criteria of paragraph (j)(1) of this section again, the water system is not required to re-submit the filter plan, unless the system has made updates to the plan or otherwise requested by the State. The plan must include:
  - (i) A description of which methods the system will use to make filters and replacement cartridges available in accordance with paragraph (j)(2) of this section (e.g., operating distribution facilities, delivering filters when requested by the consumer); and
  - (ii) A description of how the system will address any barriers to consumers obtaining filters.
- (4) A water system that meets the criteria of paragraph (j)(1) of this section must conduct a community outreach activity to discuss the multiple lead action level exceedances, steps the system is taking to reduce lead in drinking water, measures consumers can take to reduce their risk consistent with the content requirements of paragraph (a)(1)(iv) of this section, and how to obtain a filter certified to reduce lead as required in paragraph (j)(2) of this section. This activity is in addition to the public education activities required under paragraph (b)(2) of this section for community water systems, and under paragraph (b)(4) of this section for non-transient non-community water systems, that exceed the lead action level. The water system must conduct at least one activity from paragraphs (j)(4)(i) through (v) of this section within six months of the start of the tap sampling period after the most recent lead action level exceedance. The water system must conduct at least one of the activities in paragraphs (j)(4)(i) through (v) every six months until the system no longer meets the criteria of paragraph (j)(1) of this section.
  - (i) Conduct a public meeting.
  - (ii) Participate in a community event where the system can make information about ongoing lead exceedances available to the public.
  - (iii) Contact customers by phone call or voice message, text message, email, or door hanger.

- (iv) Conduct a social media campaign.
- (v) Use another method approved by the State.
- (5) A water system that is already conducting an outreach activity listed in paragraph (j)(4) of this section in order to meet the requirements of paragraph (h) of this section may conduct one activity that meets the requirements of paragraphs (j)(4) and (h), unless otherwise directed by the State.
- (6) A water system may discontinue the requirements of this paragraph (j) when the system no longer has at least three lead action level exceedances in a rolling five-year period, based on tap water samples collected in accordance with § 141.86. A calculated 90th percentile level at or below the lead action level based on fewer than the minimum number of required samples under § 141.86 cannot be used to meet the requirements of this paragraph (j)(6). States have the discretion to allow a water system to discontinue the requirements of this paragraph (j) earlier if the system has taken actions to reduce lead levels (e.g., re-optimized optimal corrosion control treatment or completed the service line replacement program) and the system is at or below the lead action level for two consecutive tap monitoring periods.

[72 FR 57815, Oct. 10, 2007, as amended at 86 FR 4294, Jan. 15, 2021; 89 FR 86642, Oct. 30, 2024]

### § 141.86 Monitoring requirements for lead and copper in tap water.

All water systems must sample for lead and copper at taps used to provide water for human consumption in accordance with the requirements of this section.

#### (a) *Sample site location.*

- (1) By the start of the first tap monitoring period in which sampling for lead and copper is required under paragraphs (c) and (d) of this section, each water system must identify potential tap sampling sites and submit a site sample plan to the State as required in § 141.90(a)(1)(i). States may require modifications to submitted site sample plans. Each water system must identify a pool of tap sampling sites that will allow the water system to collect the number of lead and copper tap samples required in paragraphs (c)(1) and (d)(1) of this section.
  - (i) To select sampling sites, a water system must use information regarding the material of service lines and connectors, including lead, copper, and galvanized iron or steel, required to be collected under § 141.84.
  - (ii) Water systems must identify locations in the site sample plan by selecting from sites in the highest tier, unless the site has been found to be unavailable, in accordance with paragraph (a)(4) of this section.
  - (iii) Sampling sites cannot include sites with installed point-of-entry (POE) treatment devices or taps with point-of-use devices designed to remove inorganic contaminants, except in water systems using these devices at all service connections for primary drinking water taps to meet other primary and secondary drinking water standards as under § 141.93(c)(1).
- (2) A water system that has fewer than five sites with drinking water taps that can be used for human consumption meeting the sample site criteria of this paragraph (a) to reach the required number of sample sites listed in paragraphs (c)(1) and (d)(1) of this section, must collect at least one sample from each tap and collect additional samples from those taps on different days during the tap sampling period to meet the required number of sites. Alternatively, the State may allow these water

systems to collect a number of samples fewer than the number of sites specified in paragraphs (c)(1) and (d)(1), provided that 100 percent of all taps that can be used for human consumption are sampled. The State must approve this reduction of the minimum number of samples in writing based on a request from the system or onsite verification by the State.

- (3) A water system serving sites with premise plumbing made of lead and/or that are served by a lead service line must collect all samples for monitoring under this section from sites with premise plumbing made of lead and/or served by a lead service line. A water system that cannot identify enough sampling sites with premise plumbing made of lead and/or served by lead service lines to meet the minimum number of sites required in paragraphs (c)(1) and (d)(1) of this section must still collect samples from every available site, in accordance with paragraph (a)(4) of this section, containing premise plumbing made of lead and/or served by a lead service line and collect the remaining samples in accordance with the tiering requirements under paragraph (a)(4).
- (4) Sampling sites must be selected from the highest tier available (Tier 1 is the highest tier and Tier 5 is the lowest tier). Sites are available unless a customer refuses to participate in sampling or a system has made at least two outreach attempts at a site and has not received a response. The number of customer refusals and non-responses for compliance sampling during each tap sampling period must be submitted to the State in accordance with the requirements at § 141.90(a)(2)(viii). Systems may continue conducting outreach at sites considered unavailable and may subsequently add such sites to the site sample plan for any reason, such as receiving a service initiation request from a new property owner or occupant or receiving a new consumer request for sampling. A system without a large enough number of sites from a higher tier to meet the number of sites required in paragraphs (c)(1) and (d)(1) of this section may sample sites from the next highest tier. For water systems where Tier 2 sites comprise at least 20 percent of the residential structures served by the community water system, Tier 2 sites may be sampled even when Tier 1 sites are available.
  - (i) Tier 1 sampling sites are single-family structures with premise plumbing made of lead and/or served by a lead service line.
  - (ii) Tier 2 sampling sites are buildings, including multiple-family residences, with premise plumbing made of lead and/or served by a lead service line.
  - (iii) Tier 3 sampling sites are sites that are served by a lead connector. Tier 3 sites are also sites served by a galvanized service line or containing galvanized premise plumbing identified as ever having been downstream of a lead service line. Tier 3 for community water systems only includes single-family structures.
  - (iv) Tier 4 sampling sites are sites that contain copper premise plumbing with lead solder installed before the effective date of the State's applicable lead ban. Tier 4 for community water systems only includes single-family structures.
  - (v) Tier 5 sampling sites are sites that are representative of sites throughout the distribution system. For purpose of this paragraph (a), a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

(b) *Sample collection protocol.*

- (1) Except for samples described in paragraphs (b)(1)(iii) and (iv) of this section, all tap samples collected for analysis of lead and copper must be one liter in volume and have stood motionless in the plumbing system and/or service line of each sampling site for at least six hours. Bottles used to

collect samples for analysis must be wide-mouth, one-liter sample bottles, as defined at § 141.2. Samples from residential housing must be collected from an interior kitchen or bathroom sink cold-water tap. Samples from a nonresidential building must be collected at an interior cold-water tap from which water is typically drawn for human consumption. Samples may be collected by the system, or the system may allow members of the public to collect samples after providing instructions for collecting samples in accordance with this paragraph (b)(1). Sample collection instructions cannot direct the sample collector to remove or clean the aerator or flush taps prior to the start of the minimum six-hour stagnation period. To protect members of the public from injury due to handling nitric acid, samples may be acidified up to 14 days after the sample is collected. After acidification to resolubilize the metals, the sample must stand in the original container for a period of time, as specified by the approved EPA method in § 141.23 selected for sample analysis. If a system allows members of the public to sample, the system cannot challenge the accuracy of the sampling results based on alleged sample collection errors.

- (i) The first-liter sample must be analyzed for lead and copper at sample sites where both contaminants are required to be monitored. At sample sites where only lead is required to be monitored, the first-liter sample may be analyzed for only lead.
  - (ii) For sites served by a lead service line, which fall under Tier 1 and Tier 2, an additional fifth-liter sample must be collected at the same time as the first-liter sample and must be analyzed for lead. To collect a first-liter-and-fifth-liter-paired sample, systems must collect tap water in five consecutively numbered, wide-mouth, one-liter sample bottles after the water has stood motionless in the plumbing of each sampling site, including the lead service line, for at least six hours without flushing the tap prior to sample collection. Systems must collect samples starting with the first sample bottle and then fill each subsequently numbered bottle in consecutive order until the final bottle is filled, with the water running constantly while the samples are being collected. In this sequence, the first-liter sample is the first sample collected and the fifth-liter sample is the final sample collected.
  - (iii) State-approved samples collected pursuant to paragraph (b)(3) of this section may include samples with stagnation periods less than six hours, but must meet all the other sample collection criteria in this paragraph (b)(1), including being one-liter in volume using a wide-mouth bottle and collected at an interior tap from which water is typically drawn for human consumption.
  - (iv) Systems may use different sample volumes and/or different sample collection procedures when they collect follow-up samples for Distribution System and Site Assessment under § 141.82(j)(2) and consumer-requested samples under § 141.85(c) to assess the source of lead. Consumer-requested samples must be collected in accordance with § 141.85(c). Systems must submit these sample results to the State in accordance with § 141.90(a)(2)(i) and (g).
- (2) Systems must sample at sites listed in the site sample plan. Additionally, systems must prioritize sampling at the same sites that were sampled in the previous tap sampling period. If such a site no longer qualifies under the tiering criteria or if, for reasons beyond the control of the water system, the water system cannot gain access to a sampling site in order to collect a tap sample, the system must collect the tap sample from another site in its site sample plan that meets the original tiering criteria, where such a site exists. Systems must report any change in sites from the previous tap sampling period, and include an explanation of why sampling sites have changed, as required in §

141.90(a)(2)(v). If changes are needed to the site sample plan, systems must submit their updated site sample plan, as required under § 141.90(a)(1)(i), before the start of the next tap sampling period conducted by the system.

- (3) A non-transient non-community water system, or a community water system that meets the criteria of § 141.85(b)(8), that does not have enough sites with taps from which first-liter samples or first-liter-and-fifth-liter-paired samples meeting the six-hour minimum stagnation time can be collected, as provided in paragraph (b)(1) of this section, may apply to the State in writing to request approval to substitute first-liter or first-liter-and-fifth-liter-paired samples that do not meet the six-hour minimum stagnation time. Such systems must collect as many first-liter or first-liter-and-fifth-liter-paired samples from interior taps used for human consumption as possible towards meeting the minimum number of sites required in paragraphs (c)(1) and (d)(1) of this section. For the remaining samples to meet the minimum number required, systems must identify sampling times and locations that would likely result in the longest standing times. The State has the discretion to waive the requirement for prior State approval of sites not meeting the six-hour stagnation time either through State regulation or written notification to the system.

(c) **Standard monitoring.** Standard monitoring consists of six-month tap monitoring periods that begin on January 1 and July 1.

- (1) **Standard monitoring sites.** During a standard tap monitoring period, a water system must collect at least one sample from the number of sites in the following table 1 to this paragraph (c)(1). Standard monitoring sites must be selected in accordance with the sampling tiers identified in paragraph (a) of this section.

**TABLE 1 TO PARAGRAPH (c)(1)**

System size (number of people served)	Standard number of sites for lead and copper sampling
>100,000	100
10,001 to 100,000	60
3,301 to 10,000	40
501 to 3,300	20
101 to 500	10
≤100	5

- (2) **Criteria for standard monitoring.** The following systems must conduct standard monitoring for at least two consecutive tap monitoring periods beginning January 1 or July 1, whichever is sooner, following the tap sampling period in which the criterion is met. Systems may then reduce monitoring in accordance with paragraph (d) of this section.

- (i) All water systems with lead or galvanized requiring replacement service lines in their inventories as of November 1, 2027, including those deemed optimized under § 141.81(b)(3), must conduct standard monitoring in the first six-month tap monitoring period following November 1, 2027, unless the system has, before or by that date, met all the following criteria:
  - (A) The system conducts compliance monitoring of sites that meet the correct priority tiering targeting sites served by lead and galvanized requiring replacement service lines in accordance with paragraph (a)(4) of this section;
  - (B) The system collects samples in accordance with all sample collection requirements in paragraphs (b)(1) and (3) of this section; and
  - (C) The system collects either first-liter samples or first-liter-and-fifth-liter- paired samples in accordance with paragraph (b)(1) of this section.
- (ii) Any water system whose most recent 90th percentile lead and/or copper results as of November 1, 2027, exceeds the lead and/or copper action level must conduct standard monitoring in the first six-month tap monitoring period following November 1, 2027.
- (iii) Systems meeting any of the following criteria:
  - (A) Any water system that exceeds a lead or copper action level.
  - (B) Any system that fails to operate at or above the minimum value or within the range of values for the optimal water quality parameters designated by the State under § 141.82(f) for more than nine days in any tap monitoring period as specified in § 141.87.
  - (C) Any water system that becomes a large water system without corrosion control treatment or any large water system without corrosion control treatment whose lead 90th percentile exceeds the lead practical quantitation limit of 0.005 mg/L.
  - (D) Any water system that installs OCCT or re-optimizes OCCT as a result of exceeding the lead or copper action level, or any water system that adjusts OCCT following a Distribution System and Site Assessment. Systems conducting standard monitoring under this criterion must continue standard monitoring until the State designates new optimal water quality parameters, at which point systems must comply with paragraph (c)(2)(iii)(E) of this section.
  - (E) Any water system for which the State has designated new values for optimal water quality parameters under § 141.82.
  - (F) Any water system that installs source water treatment pursuant to § 141.83(a)(3).
  - (G) Any water system that has notified the State in writing in accordance with § 141.90(a)(4) of an upcoming addition of a new source or long-term change in treatment, unless the State determines that the addition of the new source or long-term change in treatment is not significant and, therefore, does not warrant more frequent monitoring.
  - (H) Any water system without lead or galvanized requiring replacement service lines in its inventory that notifies the State under § 141.90(e)(4)(ii) of any subsequently discovered lead or galvanized requiring replacement service lines in its distribution system, unless the system replaces all the discovered service lines before the start of the next tap monitoring period.

(d) **Reduced monitoring based on 90th percentile levels.** Reduced monitoring refers to an annual or triennial tap monitoring period. Each annual or triennial tap monitoring period includes one tap sampling period. The reduced monitoring frequency is based on the 90th percentile value for the water system.

(1) **Reduced monitoring sites.** During a reduced tap monitoring period, a water system must collect at least one sample from the number of sites specified in table 2 to this paragraph (d)(1), unless otherwise specified. Reduced monitoring sites must be selected in accordance with the sampling tiers identified in paragraph (a) of this section. Lead and copper sampling results collected from point-of-use sites under § 141.93(c)(1) cannot be used to meet the criteria for reduced monitoring under this section. States may specify the locations of sample sites when a system is conducting reduced monitoring.

**TABLE 2 TO PARAGRAPH (d)(1)**

System size (number of people served)	Reduced minimum number of sites for lead and copper sampling
>100,000	50
10,001 to 100,000	30
3,301 to 10,000	20
501 to 3,300	10
101 to 500	5
≤100	5

(2) **Criteria for reduced monitoring.** Systems are eligible for reduced monitoring if they meet all the requirements of this section, including collecting at least the minimum number of samples required, for at least two consecutive tap monitoring periods. The State may require an eligible system to conduct more frequent monitoring.

(i) **Annual monitoring for any system size.** Any system that does not exceed the lead and copper action levels and, for systems with State-designated OWQPs, also maintains the range of optimal water quality parameters designated by the State in accordance with § 141.82(f), for two consecutive six-month tap monitoring periods may reduce the monitoring frequency to annual monitoring. Systems with an annual tap monitoring period must sample at least the standard number of sampling sites for lead in paragraph (c)(1) of this section and at least the reduced number of sites for copper as specified in paragraph (d)(1) of this section. Prior to conducting annual monitoring, systems must receive a written determination from the State approving annual monitoring based on the State's review of monitoring, treatment, and other



relevant information submitted by the system as required by § 141.90. For systems that reduce to annual monitoring, the first annual tap monitoring period must begin no later than six months following the last tap monitoring period.

(ii) **Triennial monitoring for small and medium water systems.** Any small or medium water system that does not exceed the lead and copper action levels and, for systems with State-designated OWQPs, also maintains the range of optimal water quality parameters designated by the State in accordance with § 141.82(f), during three consecutive years of monitoring, including monitoring conducted at both standard and annual frequencies (standard monitoring completed during both six-month periods of a calendar year is considered one year of monitoring), may reduce the monitoring frequency to triennial monitoring. Systems on triennial monitoring must sample at least the reduced number of sites for lead and copper in accordance with paragraph (d)(1) of this section. Prior to conducting triennial monitoring, systems must receive a written determination from the State approving triennial monitoring based on the State's review of monitoring, treatment, and other relevant information submitted by the system as required by § 141.90. For systems that reduce to triennial monitoring, the first triennial tap monitoring period must immediately follow the last annual monitoring period, and the first triennial sampling period must begin no later than three calendar years after the last calendar year in which the system sampled.

(iii) **Triennial monitoring for any system size.** Any water system that demonstrates for two consecutive tap monitoring periods that its 90th percentile lead level, calculated under § 141.80(c)(3), is less than or equal to 0.005 mg/L, the 90th percentile copper level, calculated under § 141.80(c)(3), is less than or equal to 0.65 mg/L and, for systems with State-designated OWQPs, also maintains the range of optimal water quality parameters designated by the State in accordance with § 141.82(f), may reduce the monitoring frequency to triennial monitoring. Systems on triennial monitoring must sample at least the reduced number of sites for lead and copper in accordance with paragraph (d)(1) of this section. Prior to conducting triennial monitoring, systems must receive a written determination from the State approving triennial monitoring based on the State's review of monitoring, treatment, and other relevant information submitted by the system as required by § 141.90. For systems that reduce to triennial monitoring, the first triennial tap monitoring period must immediately follow the last monitoring period, and the first triennial tap sampling period must begin no later than three calendar years after the last calendar year in which the system sampled.

(3) **Tap sampling period under reduced monitoring.** The tap sampling period for systems on reduced monitoring must occur within the months of June, July, August, or September, unless the State has approved a different tap sampling period in accordance with paragraph (d)(3)(i) of this section. Only systems on reduced monitoring can monitor during a tap sampling period that is shorter than the tap monitoring period.

(i) The State may approve a different tap sampling period for systems collecting samples on reduced monitoring. An alternative tap sampling period approved by the State must be a continuous period of time no longer than four consecutive months, must occur entirely within one calendar year, and must represent a time of normal operation where the highest levels of lead are most likely to occur. For a non-transient non-community water system that does not operate during the months of June through September and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, the State must designate a period that represents normal operation for the system.

- (ii) Systems that receive State-approval for an alternate tap sampling period under paragraph (d)(3)(i) of this section and have been sampling in the months of June through September must complete their next tap sampling period no later than 21 months, if on annual monitoring, or no later than 45 months, if on triennial monitoring, following the end of the previous tap sampling period.
  - (iii) Systems with waivers granted pursuant to paragraph (g) of this section that have been collecting samples during the months of June through September and receive State approval to alter their sampling period as per paragraph (d)(3)(i) of this section must collect their next round of samples before the end of the next nine-year period.
- (e) ***Inclusion of lead and copper tap samples for calculation of the 90th percentile.*** Water systems and the State must consider the results of any sampling conducted in addition to the minimum number of samples required in paragraph (c) or (d) of this section, as applicable, in making any determinations (*i.e.*, calculating the 90th percentile lead or copper level in accordance with § 141.80(c)(3)) under this subpart if the samples meet the requirements of paragraphs (a) and (b) of this section. Consumer-requested sampling conducted in accordance with § 141.85(c) must be considered if the sample meets the requirements of paragraphs (a) and (b). If multiple samples from the same site, taken during the same tap sampling period, meet the requirements of this section for consideration of the 90th percentile calculation, only the highest value from each site can be considered, except for systems under paragraph (a)(2) of this section.
- (1) Water systems sampling at one or more Tier 1 and/or Tier 2 sites in a tap sampling period that are unable to collect the minimum number of samples required in paragraph (c) or (d) of this section from Tier 1 or 2 sites must consider the lead and copper values from the next highest tier available in accordance with paragraph (a) of this section. If a water system has sufficient samples after including the samples from the next highest available tier to meet the minimum number of samples required in paragraph (c) or (d), the system may not consider additional samples from other available lower tiers. Systems (or the State) must calculate the 90th percentile lead and copper values in accordance with § 141.80(c)(3)(iii) using a total number of samples equal to the minimum number of samples required in paragraph (c) or (d). Systems must submit all additional sampling results to the State that were not used in the 90th percentile calculation.
  - (2) Systems (or the State when the State is calculating the 90th percentile) cannot include samples collected as part of Distribution System and Site Assessment under § 141.82(j)(2) in the 90th percentile calculation.
  - (3) Systems (or the State when the State is calculating the 90th percentile) cannot include follow-up samples collected as a result of monitoring after service line replacement under § 141.84(h) in the 90th percentile calculation.
- (f) ***Invalidation of lead and copper tap samples used in the calculation of the 90th percentile.*** A sample invalidated under this paragraph (f) does not count towards determining lead or copper 90th percentile levels under § 141.80(c)(3) or towards meeting the minimum monitoring requirements of paragraph (c) or (d) of this section. The system must report the results of all samples to the State and all supporting documentation for samples the system believes should be invalidated.
- (1) The State may invalidate a lead or copper tap water sample if at least one of the following conditions is met:
    - (i) The laboratory establishes that improper sample analysis caused erroneous results.

- (ii) The State determines that a sample collected for compliance purposes under this section, that is not an additional sample collected under paragraph (e) of this section, was taken from a site that did not meet the site selection criteria under paragraph (a) of this section, such as when sites of a higher tier were still available.
  - (iii) The State determines the sample was collected in a manner that did not meet the sample collection protocol under paragraph (b)(1) of this section.
  - (iv) The sample container was damaged in transit.
  - (v) There is a substantial reason to believe that the sample was subject to tampering.
- (2) To invalidate a sample under paragraph (f)(1) of this section, the State must document in writing both the decision and the rationale for the decision. States may not invalidate a sample solely on the grounds that a follow-up sample result is higher or lower than that of the original sample.
- (3) The water system must collect replacement samples for any samples invalidated under this section if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements of paragraph (c)(1) or (d)(1) of this section. Any such replacement samples must be taken as soon as possible, but no later than 20 days after the date the State notifies the system of an invalidated sample or by the end of the tap sampling period, whichever occurs later. Replacement samples taken after the end of the applicable tap sampling period can only be used to meet the monitoring requirements of the applicable tap monitoring period in paragraph (c) or (d) of this section and not a subsequent tap monitoring period. The replacement samples must be taken at the same locations as the invalidated samples, except when the sample is invalidated due to an error in meeting the site selection criteria under paragraph (a) of this section, or a system cannot gain access for sampling. The replacement samples must then be taken at locations that meet the site selection criteria other than those locations already used for sampling during the tap monitoring period.
- (g) **Monitoring waivers for systems serving 3,300 or fewer persons.** Any water system serving 3,300 or fewer persons that meets the criteria of this paragraph (g) may apply, in writing, to the State to reduce the frequency of monitoring for lead and/or copper to once every nine years. The system must meet the materials criteria specified in paragraph (g)(1) of this section and the monitoring criteria specified in paragraph (g)(2) of this section. Systems meeting only the criteria for lead may apply for a lead waiver, systems meeting only the criteria for copper may apply for a copper waiver, and systems meeting the criteria for both lead and copper may apply for a full waiver.
- (1) **Materials criteria.** The system must demonstrate that its distribution system and service lines and all drinking water supply plumbing, including plumbing conveying drinking water within all residences and buildings connected to the system, are free of lead-containing materials and/or copper-containing materials, as those terms are defined in this paragraph (g)(1), as follows:
- (i) **Lead.** To qualify for a lead waiver, the water system must certify and provide supporting documentation to the State that the system, including the distribution system and all premise plumbing, is free of all lead-containing materials, as follows:
    - (A) It contains no plastic pipes which contain lead plasticizers, or plastic service lines which contain lead plasticizers; and

- (B) It is free of lead service lines, galvanized requiring replacement service lines, lead connectors, lead pipes, lead soldered pipe joints, and leaded brass or bronze alloy fittings and fixtures, unless such fittings and fixtures meet the specifications of any standard established pursuant to 42 U.S.C. 300g-6(e) (SDWA section 1417(e)).
  - (ii) **Copper.** To qualify for a copper waiver, the water system must certify and provide supporting documentation to the State that the system contains no copper service lines or premise plumbing.
- (2) **Monitoring criteria.** The system must have completed at least one six-month round of standard tap water monitoring for lead and copper at sites approved by the State and from the number of sites required by paragraph (c)(1) of this section and demonstrate that the 90th percentile levels for any and all rounds of monitoring conducted since the system became free of all lead-containing and/or copper-containing materials, as appropriate, meet the following criteria.
  - (i) **Lead levels.** To qualify for a lead waiver, the system must demonstrate that the 90th percentile lead level does not exceed 0.005 mg/L.
  - (ii) **Copper levels.** To qualify for a copper waiver, the system must demonstrate that the 90th percentile copper level does not exceed 0.65 mg/L.
- (3) **State approval of waiver application.** The State must notify the system of its waiver determination, in writing, setting forth the basis of its decision and any condition(s) of an approved waiver. As a condition of a waiver, the State may require the system to perform specific activities (e.g., limited monitoring, periodic outreach to customers to remind them to avoid installing materials that might void the waiver) to avoid lead or copper concentrations of concern in tap water. The water system must continue monitoring for lead and copper at the tap as required by paragraphs (c) and (d) of this section, as appropriate, until it receives written notification from the State that a waiver has been approved.
- (4) **Monitoring frequency for systems with waivers.**
  - (i) A system with a full waiver must conduct tap monitoring for lead and copper in accordance with paragraph (d) of this section at least once every nine years. A system with a full waiver must provide the State with the materials certification specified in paragraph (g)(1) of this section for both lead and copper when submitting their tap sampling results to the State. Samples collected every nine years must be collected no later than every ninth calendar year.
  - (ii) A system with a lead waiver or copper waiver must conduct tap monitoring for only the waived contaminant in accordance with paragraph (d) of this section at least once every nine years. A system with a lead waiver or copper waiver must provide the State with the materials certification specified in paragraph (g)(1) of this section for only the waived contaminant when submitting their tap sampling results to the State. Also, a system must continue to monitor for the non-waived contaminant in accordance with the requirements of paragraphs (c) and (d) of this section, as appropriate.
  - (iii) Any water system with a waiver must notify the State in writing in accordance with § 141.90(a)(4) about any addition of a new source water or long-term change in treatment, as described in that section. The State may add or modify waiver conditions (e.g., require recertification that the system is free of lead-containing and/or copper-containing materials, require additional round(s) of monitoring), if the State deems any modifications are necessary to address treatment or source water changes at the system.

- (iv) If a system with a waiver becomes aware that the system is no longer free of lead-containing or copper-containing materials, as appropriate (e.g., as a result of new construction or repairs), the system must notify the State in writing no later than 60 days after becoming aware of such a change.
- (5) **Discontinuation of eligibility.** A system with a waiver where any of the following conditions occurs is not allowed to continue monitoring under its waiver:
  - (i) A system with a full waiver or a lead waiver no longer satisfies the materials criteria of paragraph (g)(1)(i) of this section or has a 90th percentile lead level greater than 0.005 mg/L.
  - (ii) A system with a full waiver or a copper waiver no longer satisfies the materials criteria of paragraph (g)(1)(ii) of this section or has a 90th percentile copper level greater than 0.65 mg/L.
  - (iii) The State notifies the system, in writing, that the waiver has been revoked, setting forth the basis of its decision.
- (6) **Requirements following waiver revocation.** A system whose waiver is revoked may re-apply for a waiver when it meets the appropriate materials criteria and monitoring criteria of paragraphs (g)(1) and (2) of this section. A system whose waiver is revoked by the State is subject to the following corrosion control treatment and lead and copper tap water monitoring requirements:
  - (i) If the system exceeds the lead and/or copper action level, the system must implement or re-optimize OCCT in accordance with the deadlines specified in § 141.81, and any other applicable requirements of this subpart.
  - (ii) If the system is at or below both the lead and copper action levels, the system must monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sampling sites specified in paragraph (d)(1) of this section.
- (7) **Pre-existing waivers.** Waivers approved by the State in writing prior to the compliance date specified in § 141.80(a)(3) are still in effect if the system has demonstrated that it is both free of lead-containing and copper-containing materials, as required by paragraph (g)(1) of this section and that its 90th percentile lead levels and 90th percentile copper levels meet the criteria of paragraph (g)(2) of this section, and the system does not meet the waiver ineligibility criteria of paragraph (g)(5) of this section.
- (h) **Publicly accessible tap monitoring results used in the 90th percentile calculation.** Unless done by the State, all water systems must make the tap monitoring results, including data used in the 90th percentile calculation under § 141.80(c)(3), publicly accessible within 60 days of the end of the tap sampling period. Under this paragraph (h), water systems are not required to make the addresses of tap sampling sites publicly accessible.
  - (1) Large water systems must make the tap monitoring results and associated data publicly accessible in a digital format.
  - (2) Small and medium water systems must make the tap monitoring results and associated data publicly accessible in either a print or digital format.
  - (3) Water systems must certify to the State, in writing, compliance with this paragraph (h) in accordance with § 141.90(a)(2)(iii) and must retain monitoring data in accordance with the recordkeeping requirements under § 141.91.

[89 FR 86647, Oct. 30, 2024]

## § 141.87 Monitoring requirements for water quality parameters.

All large water systems and all medium water systems with corrosion control treatment (unless deemed optimized under § 141.81(b)(3)), and all small and medium water systems that exceed the lead action level or copper action level must sample and monitor water quality parameters in addition to lead and copper in accordance with the requirements of this section. Any system may be required to monitor water quality parameters as determined by the State, including as provided in this section.

### (a) General requirements –

#### (1) Distribution system samples for water quality parameters.

- (i) Distribution system samples collected at water taps must be representative of water quality throughout the distribution system, considering the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Sites selected for sampling in the distribution system under this section can be the same as or different from tap sampling sites targeted for lead and copper sampling under § 141.86(a). Systems may consider selecting sites also used for total coliform sampling under § 141.21(a)(1). Sites selected for sampling in the distribution system under this section must be included in the site sample plan specified under § 141.90(a)(1). The site sample plan must be updated prior to changes to the sampling locations.
- (ii) Samples collected in the distribution system must be analyzed for the following parameters, when applicable, as specified:
  - (A) pH;
  - (B) Alkalinity;
  - (C) Orthophosphate (as PO<sub>4</sub>), when an inhibitor containing an orthophosphate compound is used;
  - (D) Silica, when an inhibitor containing a silicate compound is used; and
  - (E) Any parameters specified by the State under § 141.82(a)(1) or (f)(6).

#### (2) Entry point samples for water quality parameters.

- (i) Samples collected at the entry point(s) to the distribution system must be from locations representative of each source water after treatment. If a system draws water from more than one source water and the source waters are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions when water is representative of all sources typically being used.
- (ii) Except as provided in paragraph (b)(3)(ii) of this section for ground water systems, the following parameters must be measured at each entry point to the distribution system, when applicable, as specified:
  - (A) pH;
  - (B) When alkalinity is adjusted as part of corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity, and the alkalinity concentration;

- (C) When a corrosion inhibitor is used as part of corrosion control, a reading of the dosage rate of the inhibitor used, and the concentration of orthophosphate (as PO<sub>4</sub>) or silica (whichever is applicable); and
- (D) Any parameters specified by the State under § 141.82(a)(1) or (f)(6).

(b) *Standard monitoring for water quality parameters –*

(1) *Number of samples –*

- (i) *Distribution system samples.* Systems must collect two distribution system samples for applicable water quality parameters during each monitoring period specified under paragraphs (b)(2) through (4) of this section from each of the minimum number of sites listed in table 1 to this paragraph (b)(1)(i). Systems that collect distribution system samples for water quality parameters from additional sites as a result of the Distribution System and Site Assessment requirements in § 141.82(j) must add those sites to the minimum number of sites listed in table 1 to this paragraph (b)(1)(i) up to a maximum of not more than twice the minimum number of sites.

**TABLE 1 TO PARAGRAPH (b)(1)(i)**

System size (number of people served)	Minimum number of sites for water quality parameters
>100,000	25
10,001 to 100,000	10
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
≤100	1

(ii) *Samples at entry points.*

- (A) Systems without installed or re-optimized OCCT and without State-designated optimal water quality parameters required to collect entry point samples must collect a minimum of two entry point samples for each applicable water quality parameter at each entry point to the distribution system at least once during each monitoring period specified in paragraph (b)(2) of this section.
- (B) Systems with installed OCCT or re-optimized OCCT and/or State-designated optimal water quality parameters required to collect entry point samples, including as provided in paragraph (b)(3)(iii) of this section, must collect one entry point sample for each

applicable water quality parameter at each entry point to the distribution system at least once every two weeks during each monitoring period the system is required to conduct sampling as specified in paragraphs (b)(3) and (4) and (c) of this section.

- (2) **Initial sampling for water systems.** A large water system without corrosion control treatment must begin monitoring for water quality parameters as specified in paragraphs (b)(2)(i) and (ii) of this section during the first two six-month monitoring periods beginning no later than January 1 of the calendar year after the system either becomes a large water system or exceeds the practical quantitation limit for lead. Any medium water system without corrosion control treatment that exceeds the lead action level or the copper action level must begin monitoring for applicable distribution system and entry point water quality parameters as specified in paragraphs (b)(2)(i) and (ii) for two consecutive six-month monitoring periods beginning the month immediately following the end of the tap monitoring period in which the action level exceedance occurred. Any small water system that exceeds the lead or copper action level must begin monitoring for applicable distribution system and entry point water quality parameters as specified in paragraphs (b)(2)(i) and (ii) for two consecutive six-month monitoring periods beginning the month immediately following the end of the tap monitoring period in which the action level exceedance occurred. Systems must continue monitoring as described by paragraphs (b)(3) and (4) of this section.

(i) At sites in the distribution system, collect two samples for:

(A) pH; and

(B) Alkalinity.

(ii) At each entry point to the distribution system, collect all the applicable parameters listed in paragraph (a)(2)(ii) of this section.

- (3) **Monitoring after installation of OCCT or re-optimized OCCT.**

(i) A system that modifies or installs OCCT pursuant to § 141.81(d)(5) or (e)(5) and is required to conduct follow-up monitoring for lead or copper pursuant to § 141.81(d)(6) or (e)(6) must monitor for applicable distribution system and entry point water quality parameters as specified in paragraphs (a)(1) and (2) of this section every six months until the State designates new water quality parameter values for OCCT pursuant to § 141.82(f). Water systems must collect these samples at a regular frequency throughout the six-month monitoring period to reflect seasonal variability.

(ii) Any ground water system can limit entry point sampling described in paragraph (a)(2) of this section to those entry points that are representative of water quality and treatment conditions throughout the system. If water from untreated ground water sources mixes with water from treated ground water sources, the system must monitor for water quality parameters both at representative entry points receiving treatment and representative entry points receiving no treatment. Prior to the start of any monitoring under this paragraph (b)(3)(ii), the water system must provide to the State, written information and documentation identifying the selected entry points, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.



- (iii) States may require small water systems with corrosion control treatment for which the State has not designated optimal water quality parameters that do not exceed the lead action level or copper action level to conduct water quality parameter monitoring as described in this paragraph (b) or the State can develop its own water quality parameter monitoring structure for these systems.

(4) ***Monitoring by systems with State-designated optimal water quality parameter values for OCCT.***

Monitoring must occur at a regular frequency throughout the monitoring period to reflect seasonal variability and be consistent with the requirements in paragraphs (a)(1) and (2) of this section.

- (i) Medium water systems with corrosion control treatment and all large water systems must sample for the applicable water quality parameters designated by the State and determine compliance with the requirements of § 141.82(g) every six months with the first six-month monitoring period to begin on either January 1 or July 1, whichever comes first, after the State specifies the optimal values under § 141.82(f).
- (ii) A small water system with corrosion control treatment that exceeds the lead action level or copper action level must begin monitoring during the standard six-month tap monitoring period immediately following the tap monitoring period in which the action level exceedance(s) occurs and continue monitoring until the water system no longer exceeds the lead action level and/or copper action level and meets the State-designated optimal water quality parameters in two consecutive six-month tap monitoring periods under § 141.86(c). For any small water system that is subject to a reduced monitoring frequency pursuant to § 141.86(d) at the time of the action level exceedance, the start of the six-month monitoring period under this paragraph (b)(4)(ii) must coincide with the start of the tap monitoring period under § 141.86(c).
- (iii) Compliance with State-designated optimal water quality parameter values must be determined as specified under § 141.82(g).
- (iv) States have the discretion to require systems described in paragraph (b)(4)(ii) of this section to continue to monitor optimal water quality parameters.

(c) ***Reduced monitoring.***

- (1) A medium or large water system that maintains the range of values for the water quality parameters reflecting OCCT specified by the State under § 141.82(f) and does not exceed the lead action level or copper action level in either of the two consecutive six-month monitoring periods under paragraph (b)(4) of this section must collect two distribution system samples for applicable water quality parameters specified in paragraph (a)(1)(ii) of this section from each of the minimum number of sites listed in table 2 to this paragraph (c)(1) during each six-month monitoring period. These water systems must collect these samples at a regular frequency throughout the six-month monitoring period to reflect seasonal variability. A system meeting the requirements of this paragraph (c)(1) must continue to monitor at the entry point(s) to the distribution system as specified in paragraph (a)(2) of this section. Systems with sites added as a result of the Distribution System and Site

Assessment requirements in § 141.82(j) must continue to sample at the added sites up to a maximum of not more than twice the minimum number of sites specified in table 1 to paragraph (b)(1)(i) of this section.

**TABLE 2 TO PARAGRAPH (c)(1)**

<b>System size (number of people served)</b>	<b>Reduced minimum number of sites for water quality parameters</b>
>100,000	10
10,001 to 100,000	7
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
≤100	1

(2)

(i) A water system that maintains the range of values for the water quality parameters reflecting OCCT specified by the State under § 141.82(f) and does not exceed the lead action level or copper action level during three consecutive years of monitoring may reduce the frequency with which it collects distribution system samples for applicable water quality parameters specified in paragraph (a)(1)(ii) of this section from each of the minimum number of sites listed in table 2 to paragraph (c)(1) of this section from every six months to annually. This sampling must begin during the calendar year immediately following the end of the monitoring period in which the third consecutive year of six-month monitoring occurs.

(ii) A water system may reduce the frequency with which it collects distribution system samples for applicable water quality parameters specified in paragraph (c)(1) of this section to every year if it demonstrates during two consecutive monitoring periods that its tap water lead level at the 90th percentile is less than or equal to the practical quantitation limit for lead of 0.005 mg/L, that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L as calculated in accordance with § 141.80(c)(3), and that it also has maintained the range of values for the water quality parameters reflecting OCCT specified by the State under § 141.82(f).

(3) A water system that conducts sampling at taps for water quality parameters annually must collect these samples at a regular frequency throughout the year to reflect seasonal variability.

- (4) A water system monitoring at a reduced frequency that fails to operate at or within the range of values for the optimal water quality parameters designated by the State in § 141.82(f) for more than nine cumulative days, as specified in § 141.82(g), in any six-month period under paragraph (b)(4) of this section must resume distribution system sampling in accordance with the number and frequency requirements in paragraph (b)(4). Such a system may resume annual monitoring for water quality parameters in the distribution system at the reduced number of sites specified in paragraph (c)(1) of this section after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of paragraph (c)(1) of this section and/or may resume annual monitoring for water quality parameters in the distribution system at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (c)(2)(i) or (ii) of this section.
- (5) Any water system monitoring at a reduced frequency that exceeds the lead action level or copper action level must resume standard water quality parameter monitoring beginning with the six-month period immediately following the tap monitoring period in which the action level exceedance(s) occurs. When the water system no longer exceeds the lead action level and/or copper action level and meets the State-designated optimal water quality parameters in two consecutive six-month tap monitoring periods, the system may then reduce monitoring in accordance with paragraphs (c)(1) and (2) of this section.
- (d) **Additional monitoring by systems.** The results of any monitoring conducted in addition to the minimum requirements of this section must be considered by the water system and the State in determining concentrations of water quality parameters under this section or § 141.82.

[89 FR 86652, Oct. 30, 2024]

## § 141.88 Monitoring requirements for lead and copper in source water.

- (a) **Sample location, collection methods, and number of samples.**
  - (1) A water system that fails to meet the lead or copper action level on the basis of tap samples collected in accordance with § 141.86 shall collect lead and copper source water samples in accordance with the following requirements regarding sample location, number of samples, and collection methods:
    - (i) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point). The system shall take one sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
    - (ii) Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point). The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

Note to paragraph (a)(1)(ii): For the purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.

- (iii) If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (*i.e.*, when water is representative of all sources being used).
- (iv) The State may reduce the total number of samples which must be analyzed by allowing the use of compositing. Compositing of samples must be done by certified laboratory personnel. Composite samples from a maximum of five samples are allowed, provided that if the lead concentration in the composite sample is greater than or equal to 0.001 mg/L or the copper concentration is greater than or equal to 0.160 mg/L, then either:

- (A) A follow-up sample shall be taken and analyzed within 14 days at each sampling point included in the composite; or
- (B) If duplicates of or sufficient quantities from the original samples from each sampling point used in the composite are available, the system may use these instead of resampling.

- (2) Where the results of sampling indicate an exceedance of maximum permissible source water levels established under § 141.83(b)(4), the State may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point. If a State-required confirmation sample is taken for lead or copper, then the results of the initial and confirmation sample shall be averaged in determining compliance with the State-specified maximum permissible levels. Any sample value below the detection limit shall be considered to be zero. Any value above the detection limit but below the PQL shall either be considered as the measured value or be considered one-half the PQL.

- (b) **Monitoring frequency after system exceeds tap water action level.** Any system which exceeds the lead or copper action level at the tap for the first time or for the first time after an addition of a new source or installation of source water treatment required under § 141.83(b)(2) shall collect one source water sample from each entry point to the distribution system no later than six months after the end of the tap sampling period during which the lead or copper action level was exceeded. For tap sampling periods that are annual or less frequent, the end of the tap sampling period is September 30 of the calendar year in which the sampling occurs, or if the State has established an alternate monitoring period, the last day of that period. If the State determines that source water treatment is not required under § 141.83(b)(2), the state may waive source water monitoring, for any subsequent lead or copper action level exceedance at the tap, in accordance with the requirements in paragraphs (b)(1)(i) through (iii) of this section.

- (1) The State may waive source water monitoring for lead or copper action level exceedance at the tap under the following conditions:

- (i) The water system has already conducted source water monitoring following a previous action level exceedance;
- (ii) The State has determined that source water treatment is not required; and
- (iii) The system has not added any new water sources.

- (2) [Reserved]

- (c) **Monitoring frequency after installation of source water treatment and addition of new source.**

- (1) Any system which installs source water treatment pursuant to § 141.83(a)(3) shall collect one source water sample from each entry point to the distribution system during two consecutive six-month monitoring periods by the deadline specified in § 141.83(a)(4).

- (2) Any system which adds a new source shall collect one source water sample from each entry point to the distribution system until the system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the State in § 141.83(b)(4) or the State determines that source water treatment is not needed.

(d) *Monitoring frequency after State specifies maximum permissible source water levels.*

- (1) A system shall monitor at the frequency specified in paragraphs (d)(1) and (2) of this section, in cases where the State specifies maximum permissible source water levels under § 141.83(b)(4).
  - (i) A water system using only groundwater shall collect samples once during the three-year compliance period (as that term is defined in § 141.2) in effect when the applicable State determination under paragraph (d)(1) of this section is made. Such systems shall collect samples once during each subsequent compliance period. Triennial samples shall be collected every third calendar year.
  - (ii) A water system using surface water (or a combination of surface and ground water) shall collect samples once during each calendar year, the first annual monitoring period to begin during the year in which the applicable State determination is made under paragraph (d)(1) of this section.
- (2) A system is not required to conduct source water sampling for lead and/or copper if the system meets the action level for the specific contaminant in tap water samples during the entire source water sampling period applicable to the system under paragraph (d)(1) (i) or (ii) of this section.

(e) *Reduced monitoring frequency.*

- (1) A water system using only groundwater may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle (as that term is defined in § 141.2) provided that the samples are collected no later than every ninth calendar year and if the system meets the following criteria:
  - (i) The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the State in § 141.83(b)(4) during at least three consecutive monitoring periods under paragraph (d)(1) of this section.
  - (ii) [Reserved]
- (2) A water system using surface water (or a combination of surface water and groundwater) may reduce the monitoring frequency in paragraph (d)(1) of this section to once during each nine-year compliance cycle (as that term is defined in § 141.2) provided that the samples are collected no later than every ninth calendar year and if the system meets the following criteria:
  - (i) The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the State in § 141.83(b)(4) for at least three consecutive years'
  - (ii) [Reserved]

- (3) A water system that uses a new source of water is not eligible for reduced monitoring for lead and/or copper until concentrations in samples collected from the new source during three consecutive monitoring periods are below the maximum permissible lead and copper concentrations specified by the State in § 141.83(a)(5).

[56 FR 26548, June 7, 1991; 57 FR 28788 and 28789, June 29, 1992, as amended at 65 FR 2012, Jan. 12, 2000; 72 FR 57819, Oct. 10, 2007; 86 FR 4302, Jan. 15, 2021]

## § 141.89 Analytical methods.

- (a) Analyses for lead, copper, pH, alkalinity, orthophosphate, and silica shall be conducted in accordance with methods in § 141.23(k)(1).
  - (1) Analyses for alkalinity, orthophosphate, pH, and silica may be performed by any person acceptable to the State. Analyses under this section for lead and copper shall only be conducted by laboratories that have been certified by EPA or the State. To obtain certification to conduct analyses for lead and copper, laboratories must:
    - (i) Analyze Performance Evaluation samples, which include lead and copper, provided by or acceptable to EPA or the State at least once a year by each method for which the laboratory desires certification; and
    - (ii) Achieve quantitative acceptance limits as follows:
      - (A) For lead:  $\pm 30$  percent of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.005 mg/L. The Practical Quantitation Level, or PQL for lead is 0.005 mg/L.
      - (B) For Copper:  $\pm 10$  percent of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.050 mg/L. The Practical Quantitation Level, or PQL for copper is 0.050 mg/L.
    - (iii) Achieve method detection limit for lead of 0.001 mg/L according to the procedures in appendix B of part 136 of this title.
    - (iv) Be currently certified by EPA or the State to perform analyses to the specifications described in paragraph (a)(1) of this section.
  - (2) States have the authority to allow the use of previously collected monitoring data for purposes of monitoring, if the data were collected and analyzed in accordance with the requirements of this subpart.
  - (3) All lead and copper levels measured between the PQL and MDL must be either reported as measured or they can be reported as one-half the PQL specified for lead and copper in paragraph (a)(1)(ii) of this section. All levels below the lead and copper MDLs must be reported as zero.
  - (4) All copper levels measured between the PQL and the MDL must be either reported as measured or they can be reported as one-half the PQL (0.025 mg/L). All levels below the copper MDL must be reported as zero.
- (b) [Reserved]

[56 FR 26548, June 7, 1991, as amended at 57 FR 28789, June 29, 1992; 57 FR 31847, July 17, 1992; 59 FR 33863, June 30, 1994; 59 FR 62470, Dec. 5, 1994; 64 FR 67466, Dec. 1, 1999; 65 FR 2012, Jan. 12, 2000; 72 FR 57819, Oct. 10, 2007; 86 FR 4303, Jan. 15, 2021]

## § 141.90 Reporting requirements.

All water systems shall report all of the following information to the State in accordance with this section.

(a) *Reporting requirements for tap monitoring for lead and copper and for distribution system and entry point monitoring for water quality parameters.*

(1) By the start of a system's first lead and copper tap monitoring period in § 141.86(c) and (d), water systems must submit the following to the State:

(i) A site sample plan, including a list of tap sample site locations for lead and copper sampling identified from the inventory in § 141.84(a), and a list of tap sampling sites and entry point to the distribution system sites for water quality parameter monitoring selected under § 141.87(a)(1) and (2). Changes to the site sample plan require systems to submit an updated site sample plan to the State before the start of the next tap sampling period conducted by the system. The State may require modifications to the site sample plan as necessary.

(A) Water systems with lead, galvanized requiring replacement, and/or lead status unknown service lines in the service line inventory conducted under § 141.84(a) and (b) must evaluate the tap sampling locations for lead and copper used in their sampling pool prior to the start of each tap sampling period, beginning with the compliance date specified in § 141.80(a)(3). Evaluations that result in changes to the site sample plan require systems to submit an updated site sample plan to the State prior to each tap sampling period conducted by the system.

(B) A water system that cannot identify enough sampling sites with premise plumbing made of lead and/or served by lead service lines to meet the minimum number of sample sites required in § 141.86(c)(1) or (d)(1), as required under § 141.86(a)(3), must submit documentation, including documentation of applicable customer refusals for sampling, in support of the conclusion that there are an insufficient number of available sites with premise plumbing made of lead and/or served by lead service lines, prior to the next tap sampling period.

(ii) A copy of the sample collection instructions that are provided to individuals who are sampling, which meets the requirements of § 141.86(b). If the water system seeks to modify its sample collection instructions specified in this paragraph (a)(1)(ii), it must submit the updated version of the instructions to the State for review prior to the next tap sampling period.

(2) Notwithstanding the requirements of § 141.31(a), a water system must report the information specified in paragraphs (a)(2)(i) through (vii) of this section, for all lead and copper tap samples specified in § 141.86 and for all water quality parameter distribution system and entry point samples specified in § 141.87, within the first 10 days following the end of each applicable sampling period specified in §§ 141.86 and 141.87, unless the State has specified an earlier reporting requirement. For tap sampling periods with a duration less than six months, the end of the sampling period is the last date samples can be collected as specified in § 141.86.

- (i) The results of all tap samples for lead and copper collected during the tap sampling period, including results for both first- and fifth-liter samples collected at lead service line sites, the location of each site, and the site selection criteria under § 141.86(a)(3) and (4) used as the basis for which the site was selected for the water system's sampling pool;
  - (ii) Documentation for each tap water lead or copper sample for which the water system requests invalidation pursuant to § 141.86(f);
  - (iii) With the exception of initial tap sampling conducted pursuant to § 141.86(c)(2)(i), a certification that the results of monitoring from the tap monitoring period before the applicable tap monitoring period described in this paragraph (a)(2) were made publicly accessible, as specified in § 141.86(h);
  - (iv) The 90th percentile lead and copper concentrations calculated from lead and copper tap water samples collected during each tap sampling period in accordance with § 141.80(c)(3), unless the State calculates the water system's 90th percentile lead and copper levels under paragraph (h) of this section;
  - (v) With the exception of initial tap sampling conducted pursuant to § 141.86(c)(2)(i), the water system must identify any site which was not sampled during the tap monitoring period previous to the applicable tap monitoring period described in this paragraph (a)(2), and include an explanation of why sampling sites have changed;
  - (vi) The results of all tap samples for water quality parameters that are required to be collected under § 141.87(b) through (d);
  - (vii) The results of all samples collected at the entry point(s) to the distribution system for applicable water quality parameters under § 141.87(b) through (d); and
  - (viii) The number of sites from which the system requested customer participation for sampling during the tap sampling period and the customer was either non-responsive after two attempts or refused to participate.
- (3) For a non-transient non-community water system, or a community water system meeting the criteria of § 141.85(b)(8), that does not have enough taps that can provide first liter or first-and fifth-liter paired samples meeting the six-hour minimum stagnation time, the water system must either:
- (i) Provide written documentation identifying standing times and locations for samples that do not meet the six-hour minimum stagnation time to make up a system's sampling pool in order to meet the minimum number of sites to sample as required in § 141.86(b)(3) by the start of the system's first applicable tap monitoring period under § 141.86(c), or if there are changes to the documentation, prior to the next tap sampling period, unless the State has waived prior approval of sample sites not meeting the six-hour stagnation time selected by the water system pursuant to § 141.86(b)(3); or
  - (ii) If the State has waived prior approval of sample sites not meeting the six-hour stagnation time selected by the system, identify, in writing, each site that did not meet the six-hour minimum stagnation time and the length of standing time for that particular substitute sample collected pursuant to § 141.86(b)(3) and include this information with the lead and copper tap sample results required to be submitted pursuant to paragraph (a)(2)(i) of this section.



- (4) At a time specified by the State, or if no specific time is designated, as early as possible but no later than six months prior to the addition of a new source or any long-term change in water treatment, a water system must submit written documentation describing the addition of a new source or long-term change in treatment to the State. Systems may not implement the addition of a new source or long-term treatment change without State approval. The State must review and approve the addition of a new source or a long-term change in water treatment before it can be implemented by the water system. The State may require any such water system to take actions before or after the addition of a new source or long-term treatment change to ensure that the water system will operate and maintain optimal corrosion control treatment, such as additional water quality parameter monitoring, additional lead or copper tap sampling, and re-evaluating corrosion control treatment. Examples of long-term treatment changes include but are not limited to the addition of a new treatment process or modification of an existing treatment process. Examples of modifications include switching secondary disinfectants, switching coagulants (e.g., alum to ferric chloride), and switching corrosion inhibitor products (e.g., orthophosphate to blended phosphate). Long-term treatment changes can also include dose changes to existing chemicals if the system is planning long-term changes to its finished water pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily raw water quality changes where a new source has not been added.
  - (5) Any system serving 3,300 or fewer persons applying for a monitoring waiver under § 141.86(g), or subject to a waiver granted pursuant to § 141.86(g)(3), must provide the following information to the State in writing by the specified deadline:
    - (i) By the start of the system's first applicable tap monitoring period in § 141.86(c) and (d), any water system applying for a monitoring waiver must provide the documentation required to demonstrate that it meets the waiver criteria of § 141.86(g)(1) and (2) to the State.
    - (ii) Prior to the beginning of each tap monitoring period in which the system desires to maintain its monitoring waiver pursuant to § 141.86(g)(2) or (4), the system must provide the information required by § 141.86(g)(4)(i) and (ii) to the State.
    - (iii) No later than 60 days after it becomes aware that it is no longer free of lead-containing and/or copper-containing material, as appropriate, each system with a monitoring waiver must provide written notification to the State setting forth the circumstances resulting in the lead-containing and/or copper-containing materials being discovered in the system and what corrective action, if any, the system plans to take to remove these materials.
  - (6) Each ground water system that limits water quality parameter monitoring to a subset of entry points under § 141.87(b)(3)(ii) must provide, by the commencement of such monitoring, written correspondence to the State that identifies the selected entry points and includes information sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.
- (b) **Source water monitoring reporting requirements.** A water system must report the following within the first 10 days following the end of each source water monitoring period (i.e., annually, per compliance period, per compliance cycle) specified in § 141.88.
- (1) The sampling results for all source water samples collected in accordance with § 141.88.
  - (2) With the exception of the first round of source water sampling conducted pursuant to § 141.88(b), the system must specify any site which was not sampled during the previous monitoring period, and include an explanation of why the sampling point has changed.

- (c) **Corrosion control treatment reporting requirements.** By the applicable dates under § 141.81, systems shall report the following information:
- (1) For water systems demonstrating that they have already optimized OCCT without optimized water quality parameters set by the State, information required in § 141.81(b)(1) through (3).
  - (2) For systems required to optimize corrosion control, their recommendation regarding optimal corrosion control treatment under § 141.82(a).
  - (3) For systems required to evaluate the effectiveness of corrosion control treatments under § 141.82(c), the information required by that paragraph.
  - (4) For systems required to install OCCT or re-optimized OCCT designated by the State under § 141.82(d), a letter certifying that the system has completed installing that treatment.
  - (5) For systems not required to complete the corrosion control treatment steps under § 141.81(f), a letter certifying that the system has completed the mandatory service line replacement program or that the system has met the minimum annual replacement rate calculated under § 141.81(f)(1)(ii).
- (d) **Source water treatment reporting requirements.** By the applicable dates in § 141.83, systems shall provide the following information to the State:
- (1) If required under § 141.83(b)(1), their recommendation regarding source water treatment;
  - (2) For systems required to install source water treatment under § 141.83(b)(2), a letter certifying that the system has completed installing the treatment designated by the State within 24 months after the State designated the treatment.
- (e) **Service line inventory and replacement reporting requirements.** For the purposes of this paragraph (e), the first mandatory service line replacement “program year” is from the compliance date specified in § 141.80(a)(3) to the end of the next calendar year, where every program year afterwards is on a calendar year basis. Water systems must report the following information to the State to demonstrate compliance with the requirements of § 141.84:
- (1) No later than October 16, 2024, the water system must submit an initial inventory of service lines as required in § 141.84(a)(1), including the following:
    - (i) The number of lead service lines in the initial inventory;
    - (ii) The number of galvanized requiring replacement service lines in the initial inventory;
    - (iii) The number of lead status unknown service lines in the initial inventory; and
    - (iv) Where ownership of the service line is shared, the system must report the information in paragraphs (e)(1)(i) through (iii) of this section counting each full service line only once.
  - (2) No later than the compliance date in § 141.80(a)(3), the water system must submit to the State a baseline inventory of service lines and connectors as required in § 141.84(a)(2) through (4), including the following:
    - (i) The total number of lead service lines in the baseline inventory;
    - (ii) The total number of galvanized requiring replacement service lines in the baseline inventory;
    - (iii) The total number of lead status unknown service lines in the baseline inventory;
    - (iv) The total number of non-lead service lines in the baseline inventory;

- (v) The total number of lead connectors in the baseline inventory;
  - (vi) The total number of connectors of unknown material in the baseline inventory; and
  - (vii) Where ownership of the service line is shared, the system must report the information in paragraphs (e)(2)(i) through (vi) of this section counting each full service line only once.
- (3) Any water system that has inventoried one or more lead, galvanized requiring replacement, or lead status unknown service lines in its distribution system must:
- (i) No later than the compliance date in § 141.80(a)(3), submit a service line replacement plan as specified in § 141.84(c) to the State.
  - (ii) By January 30 after the end of the first program year, and annually by January 30 thereafter, certify to the State that there have been no updates to the service line replacement plan or, if there have been updates, submit an updated service line replacement plan. A water system may provide instructions on how to access the updated plan online instead of providing the entire updated plan to the State.
  - (iii) Systems replacing service lines under a schedule based on the deferred deadlines criteria in § 141.84(d)(5)(vi) must also meet the requirements described in § 141.84(c)(3) for submitting information to the State.
- (4) The water system must provide the State with an updated inventory by January 30 after the end of the first program year, and annually by January 30 thereafter. The updated inventory must conform with inventory requirements under § 141.84(a) and (b). A water system must provide the information regarding service line material identification and replacement as specified in § 141.84(b)(2)(iv) if providing instructions on how to access the updated inventory online instead of providing a fixed copy of the entire updated inventory as described in § 141.84(b) to the State.
- (i) When the water system has demonstrated that its inventory does not contain lead, galvanized requiring replacement, and lead status unknown service lines, and known lead connectors and connectors of unknown material, it is no longer required to submit inventory updates to the State, except as required in paragraph (e)(4)(ii) of this section.
  - (ii) In the case that a water system meeting the requirements of paragraph (e)(4)(i) of this section subsequently discovers any lead or galvanized requiring replacement service lines or lead connectors in its distribution system, it must notify the State within 60 days of discovering the service line(s) and connector(s) and prepare an updated inventory in accordance with § 141.84(b) on a schedule established by the State.
- (5) By January 30 after the end of the first program year, and annually by January 30 thereafter, the water system must certify to the State that it replaced any encountered lead connectors in accordance with § 141.84(e) or that it encountered no lead connectors during the calendar year.
- (6) By January 30 after the end of the first program year, and annually by January 30 thereafter, the water system must certify to the State that it conducted the notification and mitigation requirements for any partial and full service line replacements in accordance with § 141.84(h) or that it conducted no replacements of lead or galvanized requiring replacement service lines during the calendar year.
- (7) The water system must provide the following information about customer-initiated lead and galvanized requiring replacement service line replacements:

- (i) By January 30 after the end of the first program year, and annually by January 30 thereafter, the water system must certify that it completed all customer-initiated lead and galvanized requiring replacement service line replacements in accordance with § 141.84(f).
  - (ii) If the water system cannot meet the 45-day deadline to complete a customer-initiated lead or galvanized requiring replacement service line replacement pursuant to § 141.84(f), it must notify the State within 30 days following the replacement deadline.
- (8) By January 30 after the end of the first program year, and annually by January 30 thereafter, water systems conducting mandatory service line replacement pursuant to § 141.84(d) must submit the following information to the State:
- (i) The following information from the most recent updated inventory submitted under paragraph (e)(4) of this section, in accordance with table 2 to § 141.84(d)(6)(iii)(A):
    - (A) The total number of lead service lines in the inventory;
    - (B) The total number of galvanized requiring replacement service lines in the inventory;
    - (C) The total number of lead status unknown service lines in the inventory;
    - (D) The total number of non-lead service lines in the inventory;
    - (E) The total number of lead connectors in the inventory;
    - (F) The total number of connectors of unknown material in the inventory; and
    - (G) Where ownership of the service line is shared, the system must report the information in paragraphs (e)(8)(i)(A) through (F) of this section counting each full service line only once;
  - (ii) The total number of full lead service line replacements and full galvanized requiring replacement service line replacements that have been conducted in the preceding program year and the address associated with each replaced service line;
  - (iii) The total number of partial lead service line replacements and partial galvanized requiring replacement service line replacements that have been conducted in the preceding program year and the address associated with each partially replaced service line;
  - (iv) The total number of lead connectors that have been replaced or removed in each preceding program year and the address associated with each replaced or removed lead connector;
  - (v) The number of service lines in the replacement pool updated at the beginning of the preceding program year in accordance with § 141.84(d)(6)(i);
  - (vi) The total number of lead status unknown service lines determined to be non-lead in the preceding program year;
  - (vii) The address of each non-lead service line discovered in the preceding program year to be a lead or galvanized requiring replacement service line and the method(s) originally used to categorize the material of the service line;
  - (viii) The applicable deadline for completion of service line replacement and the expected date of completion of service line replacement; and
  - (ix) The total number of lead and galvanized requiring replacement service lines not replaced because the system does not have access to conduct full service line replacement.

- (9) Systems validating service line inventories pursuant to § 141.84(b)(5) must submit a list of the locations of any non-lead service lines identified to be a lead or galvanized requiring replacement service line as well as the method(s) used to categorize the service lines as a result of the assessment. The system must submit the specific version (including the date) of the service line inventory used to determine the number of non-lead service lines used when the number of non-lead service lines in the validation pool was determined. The system may not use an inventory older than the inventory update that was submitted to the State pursuant to § 141.84(b)(2)(iv) at the start of the year in which the validation pool was determined. The information must be submitted no later than January 30 following seven years after the compliance date in § 141.80(a)(3) unless otherwise specified by the State in accordance with § 141.84(b)(5)(iv). Documentation of previous validation efforts may be submitted by the compliance date in § 141.80(a)(3) for approval by the State as described in § 141.84(b)(5)(vi).
- (10) By January 30 after the end of the first program year, and annually by January 30 thereafter, the water system must submit to the State documentation of the reasons for each service line not replaced due to lack of access in accordance with § 141.84(d)(2). The system must also submit to the State documentation of each reasonable effort conducted where the system was not able to obtain property owner consent in accordance with § 141.84(d)(3) where consent is required by State or local law.
- (11) [Reserved]
- (12) Any system that collects samples following a partial or full lead or galvanized requiring replacement service line replacement required by § 141.84(h)(1)(iv) or (h)(3)(iv) must report the results to the State within the first ten days following the month in which the system receives the results or as specified by the State. Systems must also report any additional information as specified by the State, and in a time and manner prescribed by the State, to verify that all partial lead and galvanized requiring replacement service line replacement activities have taken place.
- (13) By January 30 after the end of the first program year, and annually by January 30 thereafter, the water system must certify to the State that it offered to inspect service lines that consumers who suspected the inventory incorrectly categorized their service line material within 30 days of receiving the customer notification in accordance with § 141.84(b)(4).

(f) **Public education program reporting requirements.**

- (1) Any water system conducting public education requirements in § 141.85 must submit a copy of all written public education materials to the State prior to delivery. The State may require the system to obtain approval of the content of written public education materials prior to delivery in accordance with § 141.85(a)(1).
- (2) Any water system that is subject to the public education requirements in § 141.85 must, within 10 days after the end of each period in which the system is required to perform public education in accordance with § 141.85(b), send written documentation to the State that contains:
  - (i) The public education materials that were delivered, and a statement certifying that the water system has delivered the public education materials that meet the content requirements in § 141.85(a) and the delivery requirements in § 141.85(b); and
  - (ii) A list of all the newspapers, radio stations, television stations, and facilities and organizations to which the system delivered public education materials during the period in which the system was required to perform public education tasks. Unless required by the State, a system that

previously has submitted this information need not resubmit it as long as there have been no changes in the distribution list and the system certifies that the public education materials were distributed to the same list submitted previously.

- (3) Each water system must send an example copy of the consumer notification of tap results to the State along with a certification that the notification has been distributed in a manner consistent with the requirements of § 141.85(d), according to the schedule as follows:
  - (i) No later than three months following the end of the tap sampling period, for tap samples used to calculate the 90th percentile value as described in § 141.86, an example copy of the consumer notification provided and a certification that the notification has been distributed in a manner consistent with the requirements of § 141.85(d).
  - (ii) Annually by January 30, for tap samples from the previous program year that are not included in paragraph (f)(3)(i) of this section, including, but not limited to consumer-requested samples outside the tap sampling period for systems on reduced monitoring, an example copy of the consumer notification provided and a certification that the notification has been distributed in a manner consistent with the requirements of § 141.85(d).
- (4) Annually by January 30, the water system must certify to the State that it delivered annual notification and service line information materials to customers and all persons served by the water system at the service connection with a lead, galvanized requiring replacement, or lead status unknown service line in accordance with § 141.85(e) for the previous calendar year. The water system must also provide an example copy of the notification and information materials for lead, galvanized requiring replacement, and lead status unknown service lines to the State.
- (5) [Reserved]
- (6) Annually by January 30, the water system must certify to the State that it delivered notification to affected customers and the persons served by the water system at the service connection and complied with the filter requirements after any disturbance of a service line known to contain or potentially containing lead in accordance with § 141.85(f) for the previous calendar year, or that the water system has not caused any disturbance of a service line known to contain or potentially contain lead, during the preceding year. The water system must also submit an example copy of the notification to the State. Water systems that are required to provide filters under § 141.85(f) must also report the number of sites with disturbances that require filters as specified under § 141.85(f) and number of filters provided.
- (7) Annually by January 30, the water system must certify to the State that it conducted an outreach activity in accordance with § 141.85(h) when it does not meet the service line replacement rate as specified in § 141.84(d) for the previous calendar year. The water system must also submit a copy to the State of the outreach materials provided.
- (8) Annually by January 30, the water system must certify to the State that it delivered the required distribution system and site assessment information and public education materials to the State and local health departments for the previous calendar year in accordance with § 141.85(i).
- (9) No later than 60 days after a water system exceeds the lead action level for the second time in a rolling five-year period, the system must submit a filter plan to the State as specified in § 141.85(j)(3). Thereafter, a system is not required to resubmit a filter plan unless requested by the State or if the system has made updates to its plan.

(10) Every six months, specifically by January 30 and July 30, any water system that meets the criteria of multiple lead action level exceedances in § 141.85(j)(1) must:

- (i) Certify compliance with the filter requirements in the previous six months (the previous July through December for January 30 reports and the previous January through June for July 30 reports) in accordance with § 141.85(j)(2) and report the number of filters provided; and
- (ii) Certify that the water system completed a public outreach activity in the previous six months (the previous July through December for January 30 reports and the previous January through June for July 30 reports) in accordance with § 141.85(j)(4) and submit a copy of the public education materials provided to consumers.

(g) ***Reporting of additional monitoring data.***

- (1) Any water system which collects more samples than the minimum required, must report the results to the State within the first 10 days following the end of the applicable monitoring period under §§ 141.86, 141.87, and 141.88 during which the samples are collected. This includes the monitoring data pertaining to distribution system and site assessment pursuant to §§ 141.82(j) and 141.86(b)(1)(iv).
- (2) The system must certify to the State the number of customer refusals or non-responses for follow-up sampling under § 141.82(j)(2) it received and documentation explaining why it was unable to collect a follow-up sample, within the first 10 days following the end of the applicable tap monitoring period in which an individual sample exceeded the action level.

(h) ***Reporting of 90th percentile lead and copper concentrations where the State calculates a water system's 90th percentile concentrations.*** A water system is not required to report the 90th percentile lead and copper concentrations measured from all lead and copper tap water samples collected during each tap sampling period, as required by paragraph (a)(2)(iv) of this section if:

- (1) The State has previously notified the water system that it will calculate the water system's 90th percentile lead and copper concentrations, based on the lead and copper tap results submitted pursuant to paragraph (h)(2)(i) of this section, and the water system provides the results of lead and copper tap water samples no later than 10 days after the end of the applicable tap sampling period; and
- (2) The system has provided the following information to the State by the date specified in paragraph (h)(1) of this section:
  - (i) The results of all tap samples for lead and copper including the location of each site and the site selection criteria under § 141.86(a)(4) used as the basis for which the site was selected for the water system's sampling pool; and
  - (ii) An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation of why sampling sites have changed; and
- (3) The State has provided the results of the 90th percentile lead and copper calculations, in writing, to the water system within 15 days of the end of the tap sampling period.

(i) ***Reporting requirements for a community water system's public education and sampling in schools and child care facilities.***

- (1) A community water system must provide a list of the schools and child care facilities they serve, or provide certification that no schools or child care facilities are served, to the State by the compliance date in § 141.80(a)(3) in accordance with § 141.92(b)(1). A water system that certifies that no schools or child care facilities are served by the water system is not required to report the information in paragraphs (i)(2) and (3) of this section. Annually by January 30, beginning one year after the compliance date in § 141.80(a)(3), the system must certify that there are no schools or child care facilities served by the water system. When the system becomes aware of one or more schools or child care facilities that it serves, it must provide a list to the State and begin to report the information in paragraphs (i)(2) and (3) of this section.
- (2) A community water system must report the lead analytical sampling results for schools and child care facilities within 30 days of receipt of the results in accordance with § 141.92(g)(1)(iii).
- (3) Beginning one year after the compliance date in § 141.80(a)(3), a community water system must send a report to the State annually by January 30 for the previous year's activity as calculated from the compliance date in § 141.80(a)(3). The report must include the following:
  - (i) Certification that the water system made a good faith effort to identify schools and child care facilities in accordance with § 141.92(b). The good faith effort may include reviewing customer records and requesting lists of schools and child care facilities from the State or other licensing agency. If there are changes to the list of schools and child care facilities that a water system serves, an updated list must be submitted at least once every five years in accordance with § 141.92(b)(2). If there are no changes to the list of schools or child care facilities the water system serves, the water system must certify there are no changes to the list.
  - (ii) Certification that the water system has delivered information about health risks from lead in drinking water to the school and child care facilities that they serve in accordance with § 141.92(c)(1).
  - (iii) During the first five years after the compliance date in § 141.80(a)(3), certification that the water system has completed the notification and sampling requirements in § 141.92(c)(2)(i) and (d)(1) for elementary schools and child care facilities and the information in paragraphs (i)(3)(iii)(A) through (E) of this section.
    - (A) The number and names of schools and child care facilities served by the water system;
    - (B) The number and names of schools and child care facilities sampled in the previous year;
    - (C) The number and names of elementary schools and child care facilities that declined sampling;
    - (D) The number and names of elementary schools and child care facilities that did not respond to outreach attempts for sampling; and
    - (E) Information pertaining to outreach attempts for sampling that were declined or not responded to by the elementary school or child care facility.
  - (iv) During the first five years after the compliance date in § 141.80(a)(3), certification that the water system has completed the notification and sampling requirements of § 141.92(c)(2)(ii) and (e) for secondary schools and the information in paragraphs (i)(3)(iii)(A) and (B) of this section.



- (v) Starting with the sixth year after the compliance date in § 141.80(a)(3), the water system must certify completion of the notification requirements of § 141.92(c)(3) and sampling requirements of § 141.92(d)(2) in elementary schools and child care facilities and § 141.92(e) for secondary schools and the information in paragraphs (i)(3)(iii)(A) and (B) of this section, thereafter.
- (vi) Certification that sampling results were provided to schools, child care facilities, and local and State health departments.
- (j) **Reporting requirements for small system compliance flexibility options.** By the applicable dates provided in paragraphs (j)(1) and (2), water systems implementing requirements pursuant to § 141.93, shall provide the following information to the State:
  - (1) Small water systems serving 3,300 or fewer and non-transient non-community water systems implementing the point-of-use device option under § 141.93(c)(1), must report the results from the tap sampling required under § 141.93(c)(1)(iv) no later than 10 days after the end of the tap sampling period. If corrective action is not completed within 30 days of a POU sample exceeding 0.010 mg/L, the system must provide documentation to the State within 30 days explaining why it was unable to correct the issue. Unless waived by the State, the water system must provide documentation to certify maintenance of the point-of-use devices.
  - (2) Small water systems serving 3,300 or fewer and non-transient non-community water systems implementing the small system compliance flexibility option to replace all lead-bearing plumbing under § 141.93(c)(2) must provide certification to the State that all lead-bearing material has been replaced on the schedule established by the State, within one year of designation of the option under § 141.93(c)(2).

[56 FR 26548, June 7, 1991; 57 FR 28789, June 29, 1992, as amended at 59 FR 33864, June 30, 1994; 65 FR 2012, Jan. 12, 2000; 72 FR 57819, Oct. 10, 2007; 86 FR 4303, Jan. 15, 2021; 86 FR 31947, June 16, 2021; 89 FR 86654, Oct. 30, 2024]

## § 141.91 Recordkeeping requirements.

Any system subject to the requirements of this subpart shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, State determinations, and any other information required by §§ 141.81 through 141.88, 141.90, 141.92, and 141.93. Each water system shall retain the records required by this section for no fewer than 12 years.

[86 FR 4306, Jan. 15, 2021]

## § 141.92 Monitoring for lead in schools and child care facilities.

- (a) **General requirements.**
  - (1) All community water systems must conduct public education and lead monitoring at the schools and child care facilities they serve unless those schools or child care facilities:
    - (i) Were constructed or had full plumbing replacement on or after January 1, 2014, or the date the State adopted standards that meet the definition of lead free in accordance with section 1417 of the Safe Drinking Water Act, as amended by the Reduction of Lead in Drinking Water Act, whichever is earlier; and
    - (ii) Are not served by a lead, a galvanized requiring replacement, or an unknown service line.

- (2) The provisions of this section do not apply to a school or child care facility that is regulated as a public water system.

(b) *List of schools and child care facilities.*

- (1) All community water systems must compile a list of schools and child care facilities they serve that meet the criteria of paragraph (a) of this section and submit the list to the State in accordance with § 141.90(i)(1) by the compliance date specified in § 141.80(a)(3).
- (2) Within five years following the compliance date in § 141.80(a)(3) and at least once every five-year period after, all community water systems must either certify in writing to the State there have been no changes to the list of schools and child care facilities or submit a revised list to the State in accordance with § 141.90(i)(3)(i).

(c) *Public education to schools and child care facilities.*

- (1) At least once a year beginning with the compliance date in § 141.80(a)(3), community water systems must contact all schools and child care facilities identified by the system in paragraph (b) of this section to provide information about the health risks from lead in drinking water consistent with the content requirements of § 141.85(a)(1)(ii) through (iv) and (vi).
- (2) Within the first five years following the compliance date in § 141.80(a)(3), community water systems must:
  - (i) Notify elementary schools and child care facilities, in accordance with the frequency requirements in paragraph (d)(1) of this section, that they are eligible to be sampled for lead by the water system. This notice must include:
    - (A) A proposed schedule for sampling at the facility; and
    - (B) Information about sampling for lead in schools and child care facilities (EPA's 3Ts for Reducing Lead in Drinking Water Toolkit, EPA-815-B-18-007, or subsequent EPA guidance).
  - (ii) Notify all secondary schools identified in paragraph (b) of this section at least once a year that they are eligible to be sampled for lead by the community water system on request. The notice must provide:
    - (A) Information on how to request sampling for lead at the facility; and
    - (B) Information about sampling for lead in schools and child care facilities (EPA's 3Ts for Reducing Lead in Drinking Water Toolkit, EPA-815-B-18-007, or subsequent EPA guidance).
- (3) Starting with the sixth year after the compliance date in § 141.80(a)(3), a community water system must contact all elementary schools, secondary schools, and child care facilities identified in paragraph (b) of this section to notify them that they are eligible to be sampled for lead by the community water system on request and provide the information in paragraphs (c)(2)(ii)(A) and (B) of this section.
- (4) Thirty days prior to any sampling event, community water systems must provide schools and child care facilities with instructions to identify outlets for lead sampling and prepare for a sampling event.

(d) *Frequency of sampling at elementary schools and child care facilities.*

- (1) Within the first five years following the compliance date in § 141.80(a)(3), community water systems must collect samples from at least 20 percent of the total of elementary schools served by the system per year and at least 20 percent of the total of child care facilities served by the system per year, or according to an alternative schedule approved by the State, until all elementary schools and child care facilities identified under paragraph (b) of this section have been sampled once or have declined to participate or are non-responsive.
    - (i) Community water systems must provide documentation to the State in accordance with § 141.90(i)(3)(iii)(D) and (E) if an elementary school or child care facility is non-responsive or otherwise declines to participate in the monitoring or education requirements of this section. For the purposes of this section:
      - (A) A community water system may consider an elementary school or child care facility non-responsive after the community water system makes at least two separate outreach attempts to contact the facility to schedule sampling and does not receive any response on either attempt; and
      - (B) A community water system may count a refusal or non-response from an elementary school or child care facility as part of the minimum 20 percent of elementary schools and child care facilities sampled per year.
    - (ii) [Reserved]
  - (2) Starting with the sixth year after the compliance date in § 141.80(a)(3), community water systems must conduct sampling as specified in paragraph (f) of this section when requested by an elementary school or child care facility.
    - (i) A community water system is not required under this paragraph (d)(2) to sample more than 20 percent of the elementary schools and child care facilities identified in paragraph (b) of this section in any given year. A community water system is not required under this paragraph (d)(2) to sample an individual elementary school or child care facility more than once in any five-year period.
    - (ii) [Reserved]
  - (3) The first time a water system includes an elementary school or child care facility in an update to the list of schools and child care facilities required to be submitted to the State in paragraph (b)(2) of this section, the water system must conduct outreach at those elementary schools and child care facilities as specified in paragraph (c)(2) of this section once prior to conducting sampling in accordance with paragraph (d)(2) of this section.
    - (i) A community water system may consider an elementary school or child care facility non-responsive after the community water system makes at least two separate outreach attempts to contact the facility to schedule sampling and does not receive any response on either attempt.
    - (ii) [Reserved]
- (e) *Frequency of sampling at secondary schools.*

- (1) Starting with the compliance date in § 141.80(a)(3), community water systems must conduct sampling as specified in paragraph (f) of this section when requested by a secondary school.

- (2) A community water system is not required under this paragraph (e) to sample more than 20 percent of the secondary schools identified in paragraph (b) of this section in any given year. A community water system is not required under this paragraph (e) to sample an individual secondary school more than once in any five-year period.

(f) ***Lead sampling protocol for schools and child care facilities.***

- (1) Community water systems must collect five samples per school and two samples per child care facility at outlets typically used to provide water for human consumption. Except as provided in paragraphs (f)(1)(iii) through (v) of this section, the outlets cannot have point-of-use devices. The community water system must sample the following types and number of outlets:
  - (i) For schools, two drinking water fountains, one kitchen faucet used for drinking or cooking, one classroom faucet or other outlet used to provide water for human consumption, and one nurse's office faucet, as available.
  - (ii) For child care facilities, one drinking water fountain, and one of either a kitchen faucet used for drinking or cooking or one classroom faucet or other outlet used to provide water for human consumption.
  - (iii) If any school or child care facility has fewer than the required number of outlets, the community water system must sample all outlets used to provide water for human consumption.
  - (iv) The community water system may sample at outlets with point-of-use devices if the facility has point-of-use devices installed on all outlets typically used to provide water for human consumption or if the school or child care facility has fewer than the required number of outlets.
  - (v) If any school or child care facility does not contain the type of outlet listed in paragraphs (f)(1)(i) through (iv) of this section, the community water system must collect a sample from another outlet typically used to provide water for human consumption as identified by the facility, to meet the required number of samples as provided in this paragraph (f)(1).
- (2) Community water systems must collect the samples from the cold water tap subject to the following additional requirements:
  - (i) Each sample for lead must be a first draw sample;
  - (ii) The sample must be 250 ml in volume;
  - (iii) The water must have remained stationary in the plumbing system of the sampling site (building) for at least 8 but no more than 18 hours; and
  - (iv) Samples must be analyzed using acidification and the corresponding analytical methods in § 141.89.
- (3) Community water system, school, or child care facility staff, or other appropriately trained individuals must collect samples in accordance with paragraphs (f)(1) and (2) of this section.

(g) ***Notification of results.***

- (1) Community water systems must provide sampling results, regardless of lead sample concentration, as soon as practicable but no later than 30 days after receipt of the results to:

- (i) The sampled school or child care facility, along with information about potential options to remediate lead in drinking water (consistent with EPA's 3Ts for Reducing Lead in Drinking Water Toolkit, EPA-815-B-18-007, or subsequent EPA guidance);
- (ii) The local and State health department; and
- (iii) The State in accordance with § 141.90(i).

(2) [Reserved]

(h) ***Alternative school and child care lead sampling programs.***

- (1) If schools and child care facilities served by a community water system are sampled for lead in drinking water under a State or local law or program, the State may exempt one or more community water system(s) from the sampling requirements of this section by issuing a written waiver:
  - (i) If the sampling meets the frequency requirements in paragraph (d) of this section for elementary schools and child care facilities and paragraph (e) of this section for secondary schools and the protocol requirements in paragraph (f) of this section; or
  - (ii) If the sampling meets the frequency requirements in paragraph (d) of this section for elementary schools and child care facilities and paragraph (e) of this section for secondary schools and the protocol requirements in paragraph (f) of this section with the exception of sample size and stagnation time in paragraphs (f)(2)(ii) and (iii) of this section and the sampling is conducted in addition to any of the following actions to remediate lead in drinking water:
    - (A) Disconnect affected fixtures;
    - (B) Replace affected fixtures with fixtures certified as lead free; and
    - (C) Install and maintain point-of-use devices certified by an American National Standards Institute accredited certifier to reduce lead levels; or
  - (iii) If the sampling is conducted in schools and child care facilities served by the community water system less frequently than once every five years and that sampling is conducted in addition to any of the actions to remediate lead in drinking water specified in paragraph (h)(1)(ii) of this section; or
  - (iv) If the school or child care facility maintains point-of-use devices as defined in § 141.2 on all outlets used to provide water for human consumption; or
  - (v) If the sampling is conducted under a grant awarded under section 1464(d) of the SDWA, consistent with the requirements of the grant and at least the minimum number of samples required in paragraph (f) of this section are collected.
- (2) The duration of the waiver cannot exceed the time period covered by the sampling and will automatically expire at the end of any 12-month period during which sampling is not conducted at the required number of schools or child care facilities.
- (3) The State must only issue a waiver to the community water system for the subset of the schools or child care facilities served by the system as designated under paragraph (b) of this section that are sampled under an alternative program as described in paragraph (h)(1) of this section.

- (4) The State may issue a written waiver applicable to more than one community water system (e.g., one waiver for all community water systems subject to a statewide sampling program that meets the requirements of this paragraph (h)).
- (5) The State may issue a waiver for community water systems to conduct the sampling requirements of this section for the first five years following the compliance date in § 141.80(a)(3) in the schools and child care facilities that were sampled for lead between January 1, 2021, and the compliance date in § 141.80(a)(3) that otherwise meets the requirements of paragraph (h)(1) of this section.

[89 FR 86659, Oct. 30, 2024]

### § 141.93 Small water system compliance flexibility.

Small community water systems serving 3,300 or fewer persons and all non-transient non-community water systems that exceed the lead action level, but do not exceed the copper action level, may elect to use this provision in lieu of the corrosion control treatment requirements otherwise applicable to small systems and non-transient non-community water systems in § 141.81(a)(3), if approved by the State. This compliance flexibility is not available to water systems where the State has obtained primacy for this subpart and the State does not adopt regulations to provide compliance flexibility consistent with this section.

- (a) Small community water systems and non-transient non-community water systems that elect to use this section must:
  - (1) For water systems with corrosion control, collect water quality parameters in accordance with § 141.87 and, if the system has not re-optimized OCCT in accordance with § 141.81(d), evaluate compliance options in paragraphs (c)(1) and (2) of this section and corrosion control treatment under § 141.81(d)(1). Water systems with corrosion control treatment in place must continue to operate and maintain optimal corrosion control treatment until the State determines, in writing, that it is no longer necessary, and meet any requirements that the State determines to be appropriate before implementing a State approved alternative compliance option described in this section.
  - (2) For systems without corrosion control, collect water quality parameters in accordance with § 141.87 and, if the system has not installed OCCT in accordance with § 141.81(e), evaluate compliance options in paragraphs (c)(1) and (2) of this section and corrosion control treatment under § 141.81(e)(1).
- (b) The system must make a compliance option recommendation to the State within six months of the end of the tap sampling period in which the lead action level exceedance occurred. Within six months of the recommendation by the water system, the State must approve or disapprove the recommendation. If the State disapproves the recommendation, the State may designate the other compliance alternative as an option for the system. If the State does not designate the other compliance alternative as an option for the system, the system must comply with the otherwise applicable corrosion control treatment requirements under § 141.81(d) for systems with corrosion control or § 141.81(e) for systems without corrosion control treatment. Water systems must follow the schedules in § 141.81(d) or (e), beginning with step 3 in § 141.81(d)(3) or (e)(3) unless the State specifies optimal corrosion control treatment pursuant to either § 141.81(d)(2) or (e)(2), as applicable. If the system fails to implement the approved alternative compliance option, or the State revokes approval for the alternative compliance option, then the system must follow the requirements for small and non-transient non-community water systems as described under § 141.81(a)(3).

(c)

- (1) **Alternative compliance option: point-of-use devices.** A water system that elects the compliance option in this paragraph (c)(1), must install, maintain, and monitor POU devices in each household and each building served by the water system.

(i)

- (A) A community water system must install a minimum of one POU device (at one tap) in every household and at every tap that is used for cooking and/or drinking in every non-residential building in its distribution system on a schedule specified by the State, but not to exceed one year after State approval.
- (B) A non-transient non-community water system must provide a POU device to every tap that is used for cooking and/or drinking on a schedule specified by the State, but not to exceed three months.

- (ii) The POU device must be independently certified by a third party to meet the American National Standards Institute standard applicable to the specific type of POU unit to reduce lead in drinking water.

- (iii) The POU device must be maintained by the water system in accordance with the manufacturer's recommendations or on a more frequent schedule if required by the State to ensure continued effective filtration, including but not limited to changing filter cartridges and resolving any operational issues. The POU device must be equipped with mechanical warnings to ensure that consumers are automatically notified of operational problems. The water system must provide documentation to the State to certify maintenance of the POU devices, unless the State waives this requirement, in accordance with § 141.90(j)(1).

- (iv) The water system must monitor, in accordance with this paragraph (c)(1)(iv), one-third of the POU devices each year and all POU devices must be monitored within a three-year cycle. First liter tap samples collected under this section must be taken after water passes through the POU device to assess its performance. Samples must be one liter in volume and have had a minimum 6-hour stagnation time. All samples must be at or below 0.010 mg/L. Water systems must report the results from the tap sampling no later than 10 days after the end of the tap sampling period in accordance with § 141.90(j)(1). If a sample exceeds 0.010 mg/L, the water system must notify the persons served by the POU device, and/or building management no later than one business day of receiving the tap sample results. The system must document and take corrective action at each site where the sample result exceeds the lead action level. Corrective action must be completed within 30 days. If the corrective action is not completed within 30 days, the system must provide documentation to the State within 30 days explaining why it was unable to correct the issue.

- (v) The water system must provide public education to consumers to inform them of proper use of POU devices.

- (A) **Content.** All small community water systems serving 3,300 or fewer persons and non-transient non-community water systems that are approved to implement POU devices under this paragraph (c)(1) must provide public education materials to inform users how to properly use POU devices to maximize the units' effectiveness in reducing lead levels in drinking water. Public education materials must meet the requirements of § 141.85(a)(1)(ii) through (iv).

- (B) **Timing.** Water systems must provide the public education materials at the time of POU device delivery.
- (C) **Delivery.** Water systems must provide the public education materials in person, by mail, or by another method approved by the State, to persons at locations where the system has delivered POU devices.
- (vi) The water system must operate and maintain the POU devices even if the system is at or below the action level in future tap monitoring periods until the system receives State approval to select the other compliance flexibility option or follow § 141.81(d) or (e) and the system has fully implemented it.
- (2) **Alternative compliance option: replacement of lead-bearing plumbing.** A water system that has control over all plumbing in its buildings, and is not served by lead, galvanized requiring replacement, or unknown service lines, must replace all plumbing that does not meet the definition of “lead free” in section 1417 of the Safe Drinking Water Act, as amended by the Reduction of Lead in Drinking Water Act and any future amendments applicable at the time of replacement. The replacement of all lead-bearing plumbing must occur on a schedule established by the State but not to exceed one year. Water systems must provide certification to the State that all lead-bearing material has been replaced in accordance with § 141.90(j)(2).

[89 FR 86661, Oct. 30, 2024]

## Subpart J—Use of Non-Centralized Treatment Devices

**Source:** 52 FR 25716, July 8, 1987, unless otherwise noted.

### § 141.100 Criteria and procedures for public water systems using point-of-entry devices.

- (a) Public water systems may use point-of-entry devices to comply with maximum contaminant levels only if they meet the requirements of this section.
- (b) It is the responsibility of the public water system to operate and maintain the point-of-entry treatment system.
- (c) The public water system must develop and obtain State approval for a monitoring plan before point-of-entry devices are installed for compliance. Under the plan approved by the State, point-of-entry devices must provide health protection equivalent to central water treatment. “Equivalent” means that the water would meet all national primary drinking water regulations and would be of acceptable quality similar to water distributed by a well-operated central treatment plant. In addition to the VOCs, monitoring must include physical measurements and observations such as total flow treated and mechanical condition of the treatment equipment.
- (d) Effective technology must be properly applied under a plan approved by the State and the microbiological safety of the water must be maintained.
- (1) The State must require adequate certification of performance, field testing, and, if not included in the certification process, a rigorous engineering design review of the point-of-entry devices.



(2) The design and application of the point-of-entry devices must consider the tendency for increase in heterotrophic bacteria concentrations in water treated with activated carbon. It may be necessary to use frequent backwashing, post-contactor disinfection, and Heterotrophic Plate Count monitoring to ensure that the microbiological safety of the water is not compromised.

(e) *All consumers shall be protected.* Every building connected to the system must have a point-of-entry device installed, maintained, and adequately monitored. The State must be assured that every building is subject to treatment and monitoring, and that the rights and responsibilities of the public water system customer convey with title upon sale of property.

[52 FR 25716, July 8, 1987; 53 FR 25111, July 1, 1988]

### § 141.101 Use of bottled water.

Public water systems shall not use bottled water to achieve compliance with an MCL. Bottled water may be used on a temporary basis to avoid unreasonable risk to health.

[63 FR 31934, June 11, 1998]

## Subpart K—Treatment Techniques

**Source:** 56 FR 3594, Jan. 30, 1991, unless otherwise noted.

### § 141.110 General requirements.

The requirements of subpart K of this part constitute national primary drinking water regulations. These regulations establish treatment techniques in lieu of maximum contaminant levels for specified contaminants.

### § 141.111 Treatment techniques for acrylamide and epichlorohydrin.

Each public water system must certify annually in writing to the State (using third party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified as follows:

Acrylamide = 0.05% dosed at 1 ppm (or equivalent)

Epichlorohydrin = 0.01% dosed at 20 ppm (or equivalent)

Certifications can rely on manufacturers or third parties, as approved by the State.

## Subpart L—Disinfectant Residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors

### § 141.130 General requirements.

(a) The requirements of this subpart L constitute national primary drinking water regulations.

- (1) The regulations in this subpart establish criteria under which community water systems (CWSs) and nontransient, noncommunity water systems (NTNCWSs) which add a chemical disinfectant to the water in any part of the drinking water treatment process must modify their practices to meet MCLs and MRDLs in §§ 141.64 and 141.65, respectively, and must meet the treatment technique requirements for disinfection byproduct precursors in § 141.135.
- (2) The regulations in this subpart establish criteria under which transient NCWSs that use chlorine dioxide as a disinfectant or oxidant must modify their practices to meet the MRDL for chlorine dioxide in § 141.65.
- (3) EPA has established MCLs for TTHM and HAA5 and treatment technique requirements for disinfection byproduct precursors to limit the levels of known and unknown disinfection byproducts which may have adverse health effects. These disinfection byproducts may include chloroform; bromodichloromethane; dibromochloromethane; bromoform; dichloroacetic acid; and trichloroacetic acid.

(b) **Compliance dates** —

- (1) **CWSs and NTNCWSs.** Unless otherwise noted, systems must comply with the requirements of this subpart as follows. Subpart H systems serving 10,000 or more persons must comply with this subpart beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this subpart beginning January 1, 2004.
  - (2) **Transient NCWSs.** Subpart H systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide in this subpart beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide in this subpart beginning January 1, 2004.
- (c) Each CWS and NTNCWS regulated under paragraph (a) of this section must be operated by qualified personnel who meet the requirements specified by the State and are included in a State register of qualified operators.
- (d) **Control of disinfectant residuals.** Notwithstanding the MRDLs in § 141.65, systems may increase residual disinfectant levels in the distribution system of chlorine or chloramines (but not chlorine dioxide) to a level and for a time necessary to protect public health, to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm run-off events, source water contamination events, or cross-connection events.

[63 FR 69466, Dec. 16, 1998, as amended at 66 FR 3776, Jan. 16, 2001]

### § 141.131 Analytical requirements.

(a) **General.**

- (1) Systems must use only the analytical methods specified in this section, or their equivalent as approved by EPA, to demonstrate compliance with the requirements of this subpart and with the requirements of subparts U and V of this part. These methods are effective for compliance monitoring February 16, 1999, unless a different effective date is specified in this section or by the State.

- (2) The following documents are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at EPA's Drinking Water Docket, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington, DC 20460, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html). EPA Method 552.1 is in Methods for the Determination of Organic Compounds in Drinking Water-Supplement II, USEPA, August 1992, EPA/600/R-92/129 (available through National Information Technical Service (NTIS), PB92-207703). EPA Methods 502.2, 524.2, 551.1, and 552.2 are in Methods for the Determination of Organic Compounds in Drinking Water-Supplement III, USEPA, August 1995, EPA/600/R-95/131 (available through NTIS, PB95-261616). EPA Method 300.0 is in Methods for the Determination of Inorganic Substances in Environmental Samples, USEPA, August 1993, EPA/600/R-93/100 (available through NTIS, PB94-121811). EPA Methods 300.1 and 321.8 are in Methods for the Determination of Organic and Inorganic Compounds in Drinking Water, Volume 1, USEPA, August 2000, EPA 815-R-00-014 (available through NTIS, PB2000-106981). EPA Method 317.0, Revision 2.0, "Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography with the Addition of a Postcolumn Reagent for Trace Bromate Analysis," USEPA, July 2001, EPA 815-B-01-001, EPA Method 326.0, Revision 1.0, "Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography Incorporating the Addition of a Suppressor Acidified Postcolumn Reagent for Trace Bromate Analysis," USEPA, June 2002, EPA 815-R-03-007, EPA Method 327.0, Revision 1.1, "Determination of Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry," USEPA, May 2005, EPA 815-R-05-008 and EPA Method 552.3, Revision 1.0, "Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection," USEPA, July 2003, EPA-815-B-03-002 can be accessed and downloaded directly on-line at <http://www.epa.gov/safewater/methods/sourcalt.html>. EPA Method 415.3, Revision 1.1, "Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water," USEPA, February 2005, EPA/600/R-05/055 can be accessed and downloaded directly on-line at [www.epa.gov/nerlcwww/ordmeth.htm](http://www.epa.gov/nerlcwww/ordmeth.htm). Standard Methods 4500-Cl D, 4500-Cl E, 4500-Cl F, 4500-Cl G, 4500-Cl H, 500-Cl I, 4500-ClO<sub>2</sub> D, 4500-ClO<sub>2</sub> E, 6251 B, and 5910 B shall be followed in accordance with Standard Methods for the Examination of Water and Wastewater, 19th or 20th Editions, American Public Health Association, 1995 and 1998, respectively. The cited methods published in either edition may be used. Standard Methods 5310 B, 5310 C, and 5310 D shall be followed in accordance with the Supplement to the 19th Edition of Standard Methods for the Examination of Water and Wastewater, or the Standard Methods for the Examination of Water and Wastewater, 20th Edition, American Public Health Association, 1996 and 1998, respectively. The cited methods published in either edition may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005. Standard Methods 4500-Cl D-00, 4500-Cl E-00, 4500-Cl F-00, 4500-Cl G-00, 4500-Cl H-00, 4500-Cl I-00, 4500-ClO<sub>2</sub> E-00, 6251 B-94, 5310 B-00, 5310 C-00, 5310 D-00 and 5910 B-00 are available at <http://www.standardmethods.org> or at EPA's Water Docket. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only Online versions that are IBR-approved. ASTM Methods D 1253-86 and D 1253-86 (Reapproved 1996) shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials International, 1996 or any ASTM edition containing the IBR-approved version of the method may be used. ASTM Method D1253-03 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing

and Materials International, 2004 or any ASTM edition containing the IBR-approved version of the method may be used. ASTM Method D 6581-00 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials International, 2001 or any ASTM edition containing the IBR-approved version of the method may be used; copies may be obtained from the American Society for Testing and Materials International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

(b) **Disinfection byproducts.**

- (1) Systems must measure disinfection byproducts by the methods (as modified by the footnotes) listed in the following table or one of the alternative methods listed in appendix A to subpart C of this part:

**APPROVED METHODS FOR DISINFECTION BYPRODUCT COMPLIANCE MONITORING**

Contaminant and methodology <sup>1</sup>	EPA method	Standard method <sup>2</sup>	SM online <sup>9</sup>	ASTM method <sup>3</sup>
TTHM				
P&T/GC/EICD & PID	502.2 <sup>4</sup>			
P&T/GC/MS	524.2			
LLE/GC/ECD	551.1			
HAA5				
LLE (diazomethane)/GC/ECD		6251 B <sup>5</sup>	6251 B-94	

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

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

<sup>3</sup> Annual Book of ASTM Standards, 2001 or any year containing the cited version of the method, Vol 11.01.

<sup>4</sup> If TTHMs are the only analytes being measured in the sample, then a PID is not required.

<sup>5</sup> The samples must be extracted within 14 days of sample collection.

<sup>6</sup> Ion chromatography & post column reaction or IC/ICP-MS must be used for monitoring of bromate for purposes of demonstrating eligibility of reduced monitoring, as prescribed in § 141.132(b)(3)(ii).

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

<sup>8</sup> Amperometric titration or spectrophotometry may be used for routine daily monitoring of chlorite at the entrance to the distribution system, as prescribed in § 141.132(b)(2)(i)(A). Ion chromatography must be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the distribution system, as prescribed in § 141.132(b)(2)(i)(B) and (b)(2)(ii).

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

Contaminant and methodology <sup>1</sup>	EPA method	Standard method <sup>2</sup>	SM online <sup>9</sup>	ASTM method <sup>3</sup>
SPE (acidic methanol)/GC/ECD	552.1 <sup>5</sup>			
LLE (acidic methanol)/GC/ECD	552.2, 552.3			
Bromate				
Ion chromatography	300.1			D 6581-00
Ion chromatography & post column reaction	317.0 Rev 2.0 <sup>6</sup> , 326.0 <sup>6</sup>			
IC/ICP-MS	321.8 <sup>6 7</sup>			
Chlorite				
Amperometric titration		4500-ClO <sub>2</sub> E <sup>8</sup>	4500-ClO <sub>2</sub> E-00 <sup>8</sup>	
Spectrophotometry	327.0 Rev 1.1 <sup>8</sup>			
Ion chromatography	300.0, 300.1, 317.0 Rev 2.0, 326.0			D 6581-00

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

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

<sup>3</sup> Annual Book of ASTM Standards, 2001 or any year containing the cited version of the method, Vol 11.01.

<sup>4</sup> If TTHMs are the only analytes being measured in the sample, then a PID is not required.

<sup>5</sup> The samples must be extracted within 14 days of sample collection.

<sup>6</sup> Ion chromatography & post column reaction or IC/ICP-MS must be used for monitoring of bromate for purposes of demonstrating eligibility of reduced monitoring, as prescribed in § 141.132(b)(3)(ii).

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

<sup>8</sup> Amperometric titration or spectrophotometry may be used for routine daily monitoring of chlorite at the entrance to the distribution system, as prescribed in § 141.132(b)(2)(i)(A). Ion chromatography must be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the distribution system, as prescribed in § 141.132(b)(2)(i)(B) and (b)(2)(ii).

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

- (2) Analyses under this section for disinfection byproducts must be conducted by laboratories that have received certification by EPA or the State, except as specified under paragraph (b)(3) of this section. To receive certification to conduct analyses for the DBP contaminants in §§ 141.64, 141.135, and subparts U and V of this part, the laboratory must:

- (i) Analyze Performance Evaluation (PE) samples that are acceptable to EPA or the State at least once during each consecutive 12 month period by each method for which the laboratory desires certification.
- (ii) Until March 31, 2007, in these analyses of PE samples, the laboratory must achieve quantitative results within the acceptance limit on a minimum of 80% of the analytes included in each PE sample. The acceptance limit is defined as the 95% confidence interval calculated around the mean of the PE study between a maximum and minimum acceptance limit of  $\pm 50\%$  and  $\pm 15\%$  of the study mean.
- (iii) Beginning April 1, 2007, the laboratory must achieve quantitative results on the PE sample analyses that are within the following acceptance limits:

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

DBP	Acceptance limits (percent of true value)	Comments
Bromate	±30	

- (iv) Beginning April 1, 2007, report quantitative data for concentrations at least as low as the ones listed in the following table for all DBP samples analyzed for compliance with §§ 141.64, 141.135, and subparts U and V of this part:

DBP	Minimum reporting level (mg/L) <sup>1</sup>	Comments
TTHM <sup>2</sup>		
Chloroform	0.0010	
Bromodichloromethane	0.0010	
Dibromochloromethane	0.0010	
Bromoform	0.0010	
HAA5 <sup>2</sup>		
Monochloroacetic Acid	0.0020	
Dichloroacetic Acid	0.0010	
Trichloroacetic Acid	0.0010	
Monobromoacetic Acid	0.0010	
Dibromoacetic Acid	0.0010	
Chlorite	0.020	Applicable to monitoring as prescribed in § 141.132(b)(2)(1)(B) and (b)(2)(ii).
Bromate	0.0050 or 0.0010	Laboratories that use EPA Methods 317.0 Revision 2.0, 326.0 or 321.8 must meet a 0.0010 mg/L MRL for

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

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

DBP	Minimum reporting level (mg/L) <sup>1</sup>	Comments
		bromate.

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

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

- (3) A party approved by EPA or the State must measure daily chlorite samples at the entrance to the distribution system.

(c) **Disinfectant residuals.**

- (1) Systems must measure residual disinfectant concentration for free chlorine, combined chlorine (chloramines), and chlorine dioxide by the methods listed in the following table or one of the alternative methods listed in appendix A to subpart C of this part:



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

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

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

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

(3) A party approved by EPA or the State must measure residual disinfectant concentration.

(d) **Additional analytical methods.** Systems required to analyze parameters not included in paragraphs (b) and (c) of this section must use the following methods or one of the alternative methods listed in appendix A to subpart C of this part. A party approved by EPA or the State must measure these parameters.

(1) **Alkalinity.** All methods allowed in § 141.89(a) for measuring alkalinity.

(2) **Bromide.** EPA Methods 300.0, 300.1, 317.0 Revision 2.0, 326.0, or ASTM D 6581-00.

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

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

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

(ii) **Ultraviolet Absorption at 254 nm ( $UV_{254}$ ).** Standard Method 5910 B or 5910 B-00 (Ultraviolet Absorption Method) or EPA Method 415.3 Revision 1.1. UV absorption must be measured at 253.7 nm (may be rounded off to 254 nm). Prior to analysis,  $UV_{254}$  samples must be filtered through a 0.45  $\mu m$  pore-diameter filter. The pH of  $UV_{254}$  samples may not be adjusted. Samples must be analyzed as soon as practical after sampling, not to exceed 48 hours.

(5) **pH.** All methods allowed in § 141.23(k)(1) for measuring pH.

(6) **Magnesium.** All methods allowed in § 141.23(k)(1) for measuring magnesium.

[63 FR 69466, Dec. 16, 1998, as amended at 66 FR 3776, Jan. 16, 2001; 71 FR 479, Jan. 4, 2006; 71 FR 37168, June 29, 2006; 74 FR 30958, June 29, 2009]

## § 141.132 Monitoring requirements.

### (a) General requirements.

- (1) Systems must take all samples during normal operating conditions.
- (2) Systems may consider multiple wells drawing water from a single aquifer as one treatment plant for determining the minimum number of TTHM and HAA5 samples required, with State approval in accordance with criteria developed under § 142.16(h)(5) of this chapter.
- (3) Failure to monitor in accordance with the monitoring plan required under paragraph (f) of this section is a monitoring violation.
- (4) Failure to monitor will be treated as a violation for the entire period covered by the annual average where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MCLs or MRDLs.
- (5) Systems may use only data collected under the provisions of this subpart to qualify for reduced monitoring.

### (b) Monitoring requirements for disinfection byproducts —

#### (1) TTHMs and HAA5 —

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

### ROUTINE MONITORING FREQUENCY FOR TTHM AND HAA5

Type of system	Minimum monitoring frequency	Sample location in the distribution system
Subpart H system serving at least 10,000 persons	Four water samples per quarter per treatment plant	At least 25 percent of all samples collected each quarter at locations representing maximum residence time. Remaining samples taken at locations representative of at least average residence time in the distribution system and representing the entire distribution system, taking into account number of persons served, different sources of water, and different treatment methods. <sup>1</sup>
Subpart H system	One water	Locations representing maximum residence time. <sup>1</sup>

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

<sup>2</sup> Multiple wells drawing water from a single aquifer may be considered one treatment plant for determining the minimum number of samples required, with State approval in accordance with criteria developed under § 142.16(h)(5) of this chapter.

Type of system	Minimum monitoring frequency	Sample location in the distribution system
serving from 500 to 9,999 persons	sample per quarter per treatment plant	
Subpart H system serving fewer than 500 persons	One sample per year per treatment plant during month of warmest water temperature.	Locations representing maximum residence time. <sup>1</sup> If the sample (or average of annual samples, if more than one sample is taken) exceeds the MCL, the system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until the system meets criteria in paragraph (b)(1)(iv) of this section.
System using only ground water not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons	One water sample per quarter per treatment plant <sup>2</sup>	Locations representing maximum residence time. <sup>1</sup>
System using only ground water not under direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons	One sample per year per treatment plant <sup>2</sup> during month of warmest water	Locations representing maximum residence time. <sup>1</sup> If the sample (or average of annual samples, if more than one sample is taken) exceeds the MCL, the system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until the system meets criteria in paragraph (b)(1)(iv) of this section.

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

<sup>2</sup> Multiple wells drawing water from a single aquifer may be considered one treatment plant for determining the minimum number of samples required, with State approval in accordance with criteria developed under § 142.16(h)(5) of this chapter.

Type of system	Minimum monitoring frequency	Sample location in the distribution system
	temperature.	

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

<sup>2</sup> Multiple wells drawing water from a single aquifer may be considered one treatment plant for determining the minimum number of samples required, with State approval in accordance with criteria developed under § 142.16(h)(5) of this chapter.

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

### REDUCED MONITORING FREQUENCY FOR TTHM AND HAA5

If you are a . . .	You may reduce monitoring if you have monitored at least one year and your . . .	To this level
Subpart H system serving at least 10,000 persons which has a source water annual average TOC level, before any treatment, $\leq 4.0$ mg/L	TTHM annual average $\leq 0.040$ mg/L and HAA5 annual average $\leq 0.030$ mg/L	One sample per treatment plant per quarter at distribution system location reflecting maximum residence time.
Subpart H system serving from 500 to 9,999 persons which has a source water annual average TOC level, before any treatment, $\leq 4.0$ mg/L	TTHM annual average $\leq 0.040$ mg/L and HAA5 annual average $\leq 0.030$ mg/L	One sample per treatment plant per year at distribution system location reflecting maximum residence time during month of warmest water temperature. NOTE: Any Subpart H system serving fewer than 500 persons may not reduce its monitoring to less than one sample per treatment plant per year.
System using only ground water not	TTHM annual average $\leq 0.040$ mg/L and HAA5	One sample per treatment plant per year at distribution system location reflecting

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

- (iii) **Monitoring requirements for source water TOC.** In order to qualify for reduced monitoring for TTHM and HAA5 under paragraph (b)(1)(ii) of this section, subpart H systems not monitoring under the provisions of paragraph (d) of this section must take monthly TOC samples every 30 days at a location prior to any treatment, beginning April 1, 2008 or earlier, if specified by the State. In addition to meeting other criteria for reduced monitoring in paragraph (b)(1)(ii) of this section, the source water TOC running annual average must be  $\leq 4.0$  mg/L (based on the most recent four quarters of monitoring) on a continuing basis at each treatment plant to reduce or remain on reduced monitoring for TTHM and HAA5. Once qualified for reduced monitoring for TTHM and HAA5 under paragraph (b)(1)(ii) of this section, a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to any treatment.
- (iv) Systems on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year (for systems which must monitor quarterly) or the result of the sample (for systems which must monitor no more frequently than annually) is no more than 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively. Systems that do not meet these levels must resume monitoring at the frequency identified in paragraph (b)(1)(i) of this section (minimum monitoring frequency column) in the quarter immediately following the monitoring period in which the system exceeds 0.060 mg/L or 0.045 mg/L for TTHMs and HAA5, respectively. For systems using only ground water not under the direct influence of surface water and serving fewer than 10,000 persons, if either the TTHM annual average is  $> 0.080$  mg/L or the HAA5 annual average is  $> 0.060$  mg/L, the system must go to the increased monitoring identified in paragraph (b)(1)(i) of this section (sample location column) in the quarter immediately following the monitoring period in which the system exceeds 0.080 mg/L or 0.060 mg/L for TTHMs or HAA5 respectively.

- (v) Systems on increased monitoring may return to routine monitoring if, after at least one year of monitoring their TTHM annual average is  $\leq 0.060$  mg/L and their HAA5 annual average is  $\leq 0.045$  mg/L.
  - (vi) The State may return a system to routine monitoring at the State's discretion.
- (2) **Chlorite.** Community and nontransient noncommunity water systems using chlorine dioxide, for disinfection or oxidation, must conduct monitoring for chlorite.
- (i) **Routine monitoring.**
    - (A) **Daily monitoring.** Systems must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the system must take additional samples in the distribution system the following day at the locations required by paragraph (b)(2)(ii) of this section, in addition to the sample required at the entrance to the distribution system.
    - (B) **Monthly monitoring.** Systems must take a three-sample set each month in the distribution system. The system must take one sample at each of the following locations: near the first customer, at a location representative of average residence time, and at a location reflecting maximum residence time in the distribution system. Any additional routine sampling must be conducted in the same manner (as three-sample sets, at the specified locations). The system may use the results of additional monitoring conducted under paragraph (b)(2)(ii) of this section to meet the requirement for monitoring in this paragraph.
  - (ii) **Additional monitoring.** On each day following a routine sample monitoring result that exceeds the chlorite MCL at the entrance to the distribution system, the system is required to take three chlorite distribution system samples at the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).
  - (iii) **Reduced monitoring.**
    - (A) Chlorite monitoring at the entrance to the distribution system required by paragraph (b)(2)(i)(A) of this section may not be reduced.
    - (B) Chlorite monitoring in the distribution system required by paragraph (b)(2)(i)(B) of this section may be reduced to one three-sample set per quarter after one year of monitoring where no individual chlorite sample taken in the distribution system under paragraph (b)(2)(i)(B) of this section has exceeded the chlorite MCL and the system has not been required to conduct monitoring under paragraph (b)(2)(ii) of this section. The system may remain on the reduced monitoring schedule until either any of the three individual chlorite samples taken quarterly in the distribution system under paragraph (b)(2)(i)(B) of this section exceeds the chlorite MCL or the system is required to conduct monitoring under paragraph (b)(2)(ii) of this section, at which time the system must revert to routine monitoring.
- (3) **Bromate** —

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

(ii) **Reduced monitoring.**

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

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

(c) **Monitoring requirements for disinfectant residuals –**

(1) **Chlorine and chloramines –**

(i) **Routine monitoring.** Until March 31, 2016, community and non-transient non-community water systems that use chlorine or chloramines must measure the residual disinfectant level in the distribution system at the same point in the distribution system and at the same time as total coliforms are sampled, as specified in § 141.21. Beginning April 1, 2016, community and non-transient non-community water systems that use chlorine or chloramines must measure the residual disinfectant level in the distribution system at the same point in the distribution system and at the same time as total coliforms are sampled, as specified in §§ 141.854 through 141.858. Subpart H systems of this part may use the results of residual disinfectant concentration sampling conducted under § 141.74(b)(6)(i) for unfiltered systems or § 141.74(c)(3)(i) for systems which filter, in lieu of taking separate samples.

(ii) **Reduced monitoring.** Monitoring may not be reduced.

(2) **Chlorine dioxide –**

(i) **Routine monitoring.** Community, nontransient noncommunity, and transient noncommunity water systems that use chlorine dioxide for disinfection or oxidation must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the



system must take samples in the distribution system the following day at the locations required by paragraph (c)(2)(ii) of this section, in addition to the sample required at the entrance to the distribution system.

(ii) **Additional monitoring.** On each day following a routine sample monitoring result that exceeds the MRDL, the system is required to take three chlorine dioxide distribution system samples. If chlorine dioxide or chloramines are used to maintain a disinfectant residual in the distribution system, or if chlorine is used to maintain a disinfectant residual in the distribution system and there are no disinfection addition points after the entrance to the distribution system (*i.e.*, no booster chlorination), the system must take three samples as close to the first customer as possible, at intervals of at least six hours. If chlorine is used to maintain a disinfectant residual in the distribution system and there are one or more disinfection addition points after the entrance to the distribution system (*i.e.*, booster chlorination), the system must take one sample at each of the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

(iii) **Reduced monitoring.** Chlorine dioxide monitoring may not be reduced.

(d) **Monitoring requirements for disinfection byproduct precursors (DBPP) –**

(1) **Routine monitoring.** Subpart H systems which use conventional filtration treatment (as defined in § 141.2) must monitor each treatment plant for TOC no later than the point of combined filter effluent turbidity monitoring and representative of the treated water. All systems required to monitor under this paragraph (d)(1) must also monitor for TOC in the source water prior to any treatment at the same time as monitoring for TOC in the treated water. These samples (source water and treated water) are referred to as paired samples. At the same time as the source water sample is taken, all systems must monitor for alkalinity in the source water prior to any treatment. Systems must take one paired sample and one source water alkalinity sample per month per plant at a time representative of normal operating conditions and influent water quality.

(2) **Reduced monitoring.** Subpart H systems with an average treated water TOC of less than 2.0 mg/L for two consecutive years, or less than 1.0 mg/L for one year, may reduce monitoring for both TOC and alkalinity to one paired sample and one source water alkalinity sample per plant per quarter. The system must revert to routine monitoring in the month following the quarter when the annual average treated water TOC  $\geq$  2.0 mg/L.

(e) **Bromide.** Systems required to analyze for bromate may reduce bromate monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly measurements for one year. The system must continue bromide monitoring to remain on reduced bromate monitoring.

(f) **Monitoring plans.** Each system required to monitor under this subpart must develop and implement a monitoring plan. The system must maintain the plan and make it available for inspection by the State and the general public no later than 30 days following the applicable compliance dates in § 141.130(b). All Subpart H systems serving more than 3300 people must submit a copy of the monitoring plan to the State no later than the date of the first report required under § 141.134. The State may also require the plan to be submitted by any other system. After review, the State may require changes in any plan elements. The plan must include at least the following elements.

(1) Specific locations and schedules for collecting samples for any parameters included in this subpart.

- (2) How the system will calculate compliance with MCLs, MRDLs, and treatment techniques.
- (3) If approved for monitoring as a consecutive system, or if providing water to a consecutive system, under the provisions of § 141.29, the sampling plan must reflect the entire distribution system.

[63 FR 69466, Dec. 16, 1998, as amended at 66 FR 3776, Jan. 16, 2001; 69 FR 38856, June 29, 2004; 71 FR 482, Jan. 4, 2006; 78 FR 10348, Feb. 13, 2013]

## § 141.133 Compliance requirements.

### (a) General requirements.

- (1) Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system fails to monitor for TTHM, HAA5, or bromate, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system failure to monitor makes it impossible to determine compliance with MRDLs for chlorine and chloramines, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average.
- (2) All samples taken and analyzed under the provisions of this subpart must be included in determining compliance, even if that number is greater than the minimum required.
- (3) If, during the first year of monitoring under § 141.132, any individual quarter's average will cause the running annual average of that system to exceed the MCL for total trihalomethanes, haloacetic acids (five), or bromate; or the MRDL for chlorine or chloramine, the system is out of compliance at the end of that quarter.

### (b) Disinfection byproducts —

#### (1) TTHMs and HAA5.

- (i) For systems monitoring quarterly, compliance with MCLs in § 141.64 must be based on a running annual arithmetic average, computed quarterly, of quarterly arithmetic averages of all samples collected by the system as prescribed by § 141.132(b)(1).
- (ii) For systems monitoring less frequently than quarterly, systems demonstrate MCL compliance if the average of samples taken that year under the provisions of § 141.132(b)(1) does not exceed the MCLs in § 141.64. If the average of these samples exceeds the MCL, the system must increase monitoring to once per quarter per treatment plant and such a system is not in violation of the MCL until it has completed one year of quarterly monitoring, unless the result of fewer than four quarters of monitoring will cause the running annual average to exceed the MCL, in which case the system is in violation at the end of that quarter. Systems required to increase monitoring frequency to quarterly monitoring must calculate compliance by including the sample which triggered the increased monitoring plus the following three quarters of monitoring.
- (iii) If the running annual arithmetic average of quarterly averages covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to § 141.32 or § 141.202, whichever is effective for your system, in addition to reporting to the State pursuant to § 141.134.

(iv) If a PWS fails to complete four consecutive quarters of monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.

(2) **Bromate.** Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly samples (or, for months in which the system takes more than one sample, the average of all samples taken during the month) collected by the system as prescribed by § 141.132(b)(3). If the average of samples covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to subpart Q, in addition to reporting to the State pursuant to § 141.134. If a PWS fails to complete 12 consecutive months' monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.

(3) **Chlorite.** Compliance must be based on an arithmetic average of each three sample set taken in the distribution system as prescribed by § 141.132(b)(2)(i)(B) and § 141.132(b)(2)(ii). If the arithmetic average of any three sample set exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to subpart Q, in addition to reporting to the State pursuant to § 141.134.

(c) **Disinfectant residuals —**

(1) **Chlorine and chloramines.**

(i) Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly averages of all samples collected by the system under § 141.132(c)(1). If the average covering any consecutive four-quarter period exceeds the MRDL, the system is in violation of the MRDL and must notify the public pursuant to subpart Q, in addition to reporting to the State pursuant to § 141.134.

(ii) In cases where systems switch between the use of chlorine and chloramines for residual disinfection during the year, compliance must be determined by including together all monitoring results of both chlorine and chloramines in calculating compliance. Reports submitted pursuant to § 141.134 must clearly indicate which residual disinfectant was analyzed for each sample.

(2) **Chlorine dioxide.**

(i) **Acute violations.** Compliance must be based on consecutive daily samples collected by the system under § 141.132(c)(2). If any daily sample taken at the entrance to the distribution system exceeds the MRDL, and on the following day one (or more) of the three samples taken in the distribution system exceed the MRDL, the system is in violation of the MRDL and must take immediate corrective action to lower the level of chlorine dioxide below the MRDL and must notify the public pursuant to the procedures for acute health risks in subpart Q in addition to reporting to the State pursuant to § 141.134. Failure to take samples in the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system will also be considered an MRDL violation and the system must notify the public of the violation in accordance with the provisions for acute violations under subpart Q in addition to reporting to the State pursuant to § 141.134.

(ii) **Nonacute violations.** Compliance must be based on consecutive daily samples collected by the system under § 141.132(c)(2). If any two consecutive daily samples taken at the entrance to the distribution system exceed the MRDL and all distribution system samples taken are below the MRDL, the system is in violation of the MRDL and must take corrective action to lower the level of chlorine dioxide below the MRDL at the point of sampling and will notify the public

pursuant to the procedures for nonacute health risks in subpart Q in addition to reporting to the State pursuant to § 141.134. Failure to monitor at the entrance to the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also an MRDL violation and the system must notify the public of the violation in accordance with the provisions for nonacute violations under § 141.32(e)(78) in addition to reporting to the State pursuant to § 141.134.

- (d) **Disinfection byproduct precursors (DBPP).** Compliance must be determined as specified by § 141.135(c). Systems may begin monitoring to determine whether Step 1 TOC removals can be met 12 months prior to the compliance date for the system. This monitoring is not required and failure to monitor during this period is not a violation. However, any system that does not monitor during this period, and then determines in the first 12 months after the compliance date that it is not able to meet the Step 1 requirements in § 141.135(b)(2) and must therefore apply for alternate minimum TOC removal (Step 2) requirements, is not eligible for retroactive approval of alternate minimum TOC removal (Step 2) requirements as allowed pursuant to § 141.135(b)(3) and is in violation. Systems may apply for alternate minimum TOC removal (Step 2) requirements any time after the compliance date. For systems required to meet Step 1 TOC removals, if the value calculated under § 141.135(c)(1)(iv) is less than 1.00, the system is in violation of the treatment technique requirements and must notify the public pursuant to subpart Q of this part, in addition to reporting to the State pursuant to § 141.134.

[63 FR 69466, Dec. 16, 1998, as amended at 65 FR 26022, May 4, 2000; 65 FR 40521, June 30, 2000; 66 FR 3777, Jan. 16, 2001; 69 FR 38856, June 29, 2004; 71 FR 482, Jan. 4, 2006]

§ 141.134 Reporting and recordkeeping requirements.

- (a) Systems required to sample quarterly or more frequently must report to the State within 10 days after the end of each quarter in which samples were collected, notwithstanding the provisions of § 141.31. Systems required to sample less frequently than quarterly must report to the State within 10 days after the end of each monitoring period in which samples were collected.
- (b) **Disinfection byproducts.** Systems must report the information specified in the following table:

If you are a * * *	You must report * * *
(1) System monitoring for TTHMs and HAA5 under the requirements of § 141.132(b) on a quarterly or more frequent basis.	(i) The number of samples taken during the last quarter. (ii) The location, date, and result of each sample taken during the last quarter. (iii) The arithmetic average of all samples taken in the last quarter. (iv) The annual arithmetic average of the quarterly arithmetic averages of this section for the last four quarters. (v) Whether, based on § 141.133(b)(1), the MCL was violated.

<sup>1</sup> The State may choose to perform calculations and determine whether the MCL was exceeded, in lieu of having the system report that information

If you are a * * *	You must report * * *
(2) System monitoring for TTHMs and HAA5 under the requirements of § 141.132(b) less frequently than quarterly (but as least annually).	(i) The number of samples taken during the last year. (ii) The location, date, and result of each sample taken during the last monitoring period. (iii) The arithmetic average of all samples taken over the last year. (iv) Whether, based on § 141.133(b)(1), the MCL was violated.
(3) System monitoring for TTHMs and HAA5 under the requirements of § 141.132(b) less frequently than annually.	(i) The location, date, and result of each sample taken (ii) Whether, based on § 141.133(b)(1), the MCL was violated.
(4) System monitoring for chlorite under the requirements of § 141.132(b)	(i) The number of entry point samples taken each month for the last 3 months. (ii) The location, date, and result of each sample (both entry point and distribution system) taken during the last quarter. (iii) For each month in the reporting period, the arithmetic average of all samples taken in each three samples set taken in the distribution system. (iv) Whether, based on § 141.133(b)(3), the MCL was violated, in which month, and how many times it was violated each month.
(5) System monitoring for bromate under the requirements of § 141.132(b).	(i) The number of samples taken during the last quarter. (ii) The location, date, and result of each sample taken during the last quarter. (iii) The arithmetic average of the monthly arithmetic averages of all samples taken in the last year. (iv) Whether, based on § 141.133(b)(2), the MCL

<sup>1</sup> The State may choose to perform calculations and determine whether the MCL was exceeded, in lieu of having the system report that information

If you are a * * *	You must report * * *
	was violated.

<sup>1</sup> The State may choose to perform calculations and determine whether the MCL was exceeded, in lieu of having the system report that information

(c) **Disinfectants.** Systems must report the information specified in the following table:

If you are a * * *	You must report * * *
(1) System monitoring for chlorine or chloramines under the requirements of § 141.132(c)	(i) The number of samples taken during each month of the last quarter. (ii) The month arithmetic average of all samples taken in each month for the last 12 months. (iii) The arithmetic average of the monthly averages for the last 12 months. (iv) Whether, based on § 141.133(c)(1), the MRD was violated.
(2) System monitoring for chlorine dioxide under the requirements of § 141.132(c).	(i) The dates, result, and locations of samples taken during the last quarter. (ii) Whether, based on § 141.133(c)(2), the MRDL was violated. (iii) Whether the MRDL was exceeded in any two consecutive daily samples and whether the resulting violation was acute or nonacute.

<sup>1</sup> The State may choose to perform calculations and determine whether the MRDL was exceeded, in lieu of having the system report that information.

(d) **Disinfection byproduct precursors and enhanced coagulation or enhanced softening.** Systems must report the information specified in the following table:

If you are a . . .	You must report. . . <sup>1</sup>
(1) System monitoring monthly or quarterly for TOC under the requirements of § 141.132(d) and required to meet the enhanced coagulation or enhanced softening requirements in § 141.135(b)(2)	(i) The number of paired (source water and treated water) samples taken during the last quarter. (ii) The location, date, and results of each paired sample and associated alkalinity taken during the last quarter.

<sup>1</sup> The State may choose to perform calculations and determine whether the treatment technique was met, in lieu of having the system report that information.

If you are a . . .	You must report. . . <sup>1</sup>
<p>or (3)</p> <p>(2) System monitoring monthly or quarterly for TOC under the requirements of § 141.132(d) and meeting one or more of the alternative compliance criteria in § 141.135(a)(2) or (3)</p>	<p>(iii) For each month in the reporting period that paired samples were taken, the arithmetic average of the percent reduction of TOC for each paired sample and the required TOC percent removal.</p> <p>(iv) Calculations for determining compliance with the TOC percent removal requirements, as provided in § 141.135(c)(1).</p> <p>(v) Whether the system is in compliance with the enhanced coagulation or enhanced softening percent removal requirements in § 141.135(b) for the last four quarters.</p> <p>(i) The alternative compliance criterion that the system is using.</p> <p>(ii) The number of paired samples taken during the last quarter.</p> <p>(iii) The location, date, and result of each paired sample and associated alkalinity taken during the last quarter.</p> <p>(iv) The running annual arithmetic average based on monthly averages (or quarterly samples) of source water TOC for systems meeting a criterion in §§ 141.135(a)(2)(i) or (iii) or of treated water TOC for systems meeting the criterion in § 141.135(a)(2)(ii).</p> <p>(v) The running annual arithmetic average based on monthly averages (or quarterly samples) of source water SUVA for systems meeting the criterion in § 141.135(a)(2)(v) or of treated water SUVA for systems meeting the criterion in § 141.135(a)(2)(vi).</p> <p>(vi) The running annual average of source water alkalinity for systems meeting the criterion in § 141.135(a)(2)(iii) and of treated water alkalinity for systems meeting the criterion in § 141.135(a)(3)(i).</p> <p>(vii) The running annual average for both TTHM and HAA5 for systems meeting the criterion in § 141.135(a)(2)(iii) or (iv).</p> <p>(viii) The running annual average of the amount of magnesium hardness removal (as CaCO<sub>3</sub>, in mg/L) for systems meeting the criterion in § 141.135(a)(3)(ii).</p>

<sup>1</sup> The State may choose to perform calculations and determine whether the treatment technique was met, in lieu of having the system report that information.

If you are a . . .	You must report. . . <sup>1</sup>
	(ix) Whether the system is in compliance with the particular alternative compliance criterion in § 141.135(a)(2) or (3).

<sup>1</sup> The State may choose to perform calculations and determine whether the treatment technique was met, in lieu of having the system report that information.

[63 FR 69466, Dec. 16, 1998, as amended at 66 FR 3778, Jan. 16, 2001; 66 FR 9903, Feb. 12, 2001]

## § 141.135 Treatment technique for control of disinfection byproduct (DBP) precursors.

### (a) Applicability.

- (1) Subpart H systems using conventional filtration treatment (as defined in § 141.2) must operate with enhanced coagulation or enhanced softening to achieve the TOC percent removal levels specified in paragraph (b) of this section unless the system meets at least one of the alternative compliance criteria listed in paragraph (a)(2) or (a)(3) of this section.
- (2) **Alternative compliance criteria for enhanced coagulation and enhanced softening systems.** Subpart H systems using conventional filtration treatment may use the alternative compliance criteria in paragraphs (a)(2)(i) through (vi) of this section to comply with this section in lieu of complying with paragraph (b) of this section. Systems must still comply with monitoring requirements in § 141.132(d).
  - (i) The system's source water TOC level, measured according to § 141.131(d)(3), is less than 2.0 mg/L, calculated quarterly as a running annual average.
  - (ii) The system's treated water TOC level, measured according to § 141.131(d)(3), is less than 2.0 mg/L, calculated quarterly as a running annual average.
  - (iii) The system's source water TOC level, measured according to § 141.131(d)(3), is less than 4.0 mg/L, calculated quarterly as a running annual average; the source water alkalinity, measured according to § 141.131(d)(1), is greater than 60 mg/L (as CaCO<sub>3</sub>), calculated quarterly as a running annual average; and either the TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively; or prior to the effective date for compliance in § 141.130(b), the system has made a clear and irrevocable financial commitment not later than the effective date for compliance in § 141.130(b) to use of technologies that will limit the levels of TTHMs and HAA5 to no more than 0.040 mg/L and 0.030 mg/L, respectively. Systems must submit evidence of a clear and irrevocable financial commitment, in addition to a schedule containing milestones and periodic progress reports for installation and operation of appropriate technologies, to the State for approval not later than the effective date for compliance in § 141.130(b). These technologies must be installed and operating not later than June 30, 2005. Failure to install and operate these technologies by the date in the approved schedule will constitute a violation of National Primary Drinking Water Regulations.



- (iv) The TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively, and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.
- (v) The system's source water SUVA, prior to any treatment and measured monthly according to § 141.131(d)(4), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.
- (vi) The system's finished water SUVA, measured monthly according to § 141.131(d)(4), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

(3) **Additional alternative compliance criteria for softening systems.** Systems practicing enhanced softening that cannot achieve the TOC removals required by paragraph (b)(2) of this section may use the alternative compliance criteria in paragraphs (a)(3)(i) and (ii) of this section in lieu of complying with paragraph (b) of this section. Systems must still comply with monitoring requirements in § 141.132(d).

- (i) Softening that results in lowering the treated water alkalinity to less than 60 mg/L (as CaCO<sub>3</sub>), measured monthly according to § 141.131(d)(1) and calculated quarterly as a running annual average.
- (ii) Softening that results in removing at least 10 mg/L of magnesium hardness (as CaCO<sub>3</sub>), measured monthly according to § 141.131(d)(6) and calculated quarterly as a running annual average.

(b) **Enhanced coagulation and enhanced softening performance requirements.**

(1) Systems must achieve the percent reduction of TOC specified in paragraph (b)(2) of this section between the source water and the combined filter effluent, unless the State approves a system's request for alternate minimum TOC removal (Step 2) requirements under paragraph (b)(3) of this section.

- (2) Required Step 1 TOC reductions, indicated in the following table, are based upon specified source water parameters measured in accordance with § 141.131(d). Systems practicing softening are required to meet the Step 1 TOC reductions in the far-right column (Source water alkalinity >120 mg/L) for the specified source water TOC:

**STEP 1 REQUIRED REMOVAL OF TOC BY ENHANCED COAGULATION AND ENHANCED SOFTENING FOR SUBPART H SYSTEMS USING CONVENTIONAL TREATMENT<sup>1 2</sup>**

Source-water TOC, mg/L	Source-water alkalinity, mg/L as CaCO <sub>3</sub> (in percentages)		
	0-60	>60-120	>120 <sup>3</sup>
>2.0-4.0	35.0	25.0	15.0
>4.0-8.0	45.0	35.0	25.0
>8.0.	50.0	40.0	30.0

<sup>1</sup> Systems meeting at least one of the conditions in paragraph (a)(2)(i)-(vi) of this section are not required to operate with enhanced coagulation.

<sup>2</sup> Softening system meeting one of the alternative compliance criteria in paragraph (a)(3) of this section are not required to operate with enhanced softening.

<sup>3</sup> System practicing softening must meet the TOC removal requirements in this column.

- (3) Subpart H conventional treatment systems that cannot achieve the Step 1 TOC removals required by paragraph (b)(2) of this section due to water quality parameters or operational constraints must apply to the State, within three months of failure to achieve the TOC removals required by paragraph (b)(2) of this section, for approval of alternative minimum TOC (Step 2) removal requirements submitted by the system. If the State approves the alternative minimum TOC removal (Step 2) requirements, the State may make those requirements retroactive for the purposes of determining compliance. Until the State approves the alternate minimum TOC removal (Step 2) requirements, the system must meet the Step 1 TOC removals contained in paragraph (b)(2) of this section.
- (4) **Alternate minimum TOC removal (Step 2) requirements.** Applications made to the State by enhanced coagulation systems for approval of alternate minimum TOC removal (Step 2) requirements under paragraph (b)(3) of this section must include, at a minimum, results of bench- or pilot-scale testing conducted under paragraph (b)(4)(i) of this section. The submitted bench- or pilot-scale testing must be used to determine the alternate enhanced coagulation level.
- (i) **Alternate enhanced coagulation level is defined as** coagulation at a coagulant dose and pH as determined by the method described in paragraphs (b)(4)(i) through (v) of this section such that an incremental addition of 10 mg/L of alum (or equivalent amount of ferric salt) results in a TOC removal of ≤0.3 mg/L. The percent removal of TOC at this point on the “TOC removal versus coagulant dose” curve is then defined as the minimum TOC removal required for the system. Once approved by the State, this minimum requirement supersedes the minimum TOC removal required by the table in paragraph (b)(2) of this section. This requirement will be

effective until such time as the State approves a new value based on the results of a new bench- and pilot-scale test. Failure to achieve State-set alternative minimum TOC removal levels is a violation of National Primary Drinking Water Regulations.

- (ii) Bench- or pilot-scale testing of enhanced coagulation must be conducted by using representative water samples and adding 10 mg/L increments of alum (or equivalent amounts of ferric salt) until the pH is reduced to a level less than or equal to the enhanced coagulation Step 2 target pH shown in the following table:

### ENHANCED COAGULATION STEP 2 TARGET pH

Alkalinity (mg/L as CaCO <sub>3</sub> )	Target pH
0-60	5.5
>60-120	6.3
>120-240	7.0
>240	7.5

- (iii) For waters with alkalinities of less than 60 mg/L for which addition of small amounts of alum or equivalent addition of iron coagulant drives the pH below 5.5 before significant TOC removal occurs, the system must add necessary chemicals to maintain the pH between 5.3 and 5.7 in samples until the TOC removal of 0.3 mg/L per 10 mg/L alum added (or equivalent addition of iron coagulant) is reached.
- (iv) The system may operate at any coagulant dose or pH necessary (consistent with other NPDPWRs) to achieve the minimum TOC percent removal approved under paragraph (b)(3) of this section.
- (v) If the TOC removal is consistently less than 0.3 mg/L of TOC per 10 mg/L of incremental alum dose at all dosages of alum (or equivalent addition of iron coagulant), the water is deemed to contain TOC not amenable to enhanced coagulation. The system may then apply to the State for a waiver of enhanced coagulation requirements.

#### (c) Compliance calculations.

- (1) Subpart H systems other than those identified in paragraph (a)(2) or (a)(3) of this section must comply with requirements contained in paragraph (b)(2) or (b)(3) of this section. Systems must calculate compliance quarterly, beginning after the system has collected 12 months of data, by determining an annual average using the following method:
  - (i) Determine actual monthly TOC percent removal, equal to:  

$$(1 - (\text{treated water TOC} / \text{source water TOC})) \times 100$$
  - (ii) Determine the required monthly TOC percent removal (from either the table in paragraph (b)(2) of this section or from paragraph (b)(3) of this section).
  - (iii) Divide the value in paragraph (c)(1)(i) of this section by the value in paragraph (c)(1)(ii) of this section.

- (iv) Add together the results of paragraph (c)(1)(iii) of this section for the last 12 months and divide by 12.
  - (v) If the value calculated in paragraph (c)(1)(iv) of this section is less than 1.00, the system is not in compliance with the TOC percent removal requirements.
- (2) Systems may use the provisions in paragraphs (c)(2)(i) through (v) of this section in lieu of the calculations in paragraph (c)(1)(i) through (v) of this section to determine compliance with TOC percent removal requirements.
- (i) In any month that the system's treated or source water TOC level, measured according to § 141.131(d)(3), is less than 2.0 mg/L, the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.
  - (ii) In any month that a system practicing softening removes at least 10 mg/L of magnesium hardness (as CaCO<sub>3</sub>), the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.
  - (iii) In any month that the system's source water SUVA, prior to any treatment and measured according to § 141.131(d)(4), is ≤2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.
  - (iv) In any month that the system's finished water SUVA, measured according to § 141.131(d)(4), is ≤2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.
  - (v) In any month that a system practicing enhanced softening lowers alkalinity below 60 mg/L (as CaCO<sub>3</sub>), the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.
- (3) Subpart H systems using conventional treatment may also comply with the requirements of this section by meeting the criteria in paragraph (a)(2) or (3) of this section.
- (d) **Treatment technique requirements for DBP precursors.** The Administrator identifies the following as treatment techniques to control the level of disinfection byproduct precursors in drinking water treatment and distribution systems: For Subpart H systems using conventional treatment, enhanced coagulation or enhanced softening.

[63 FR 69466, Dec. 16, 1998, as amended at 66 FR 3779, Jan. 16, 2001; 71 FR 482, Jan. 4, 2006]

## Subparts M-N [Reserved]

## Subpart O—Consumer Confidence Reports

**Source:** 63 FR 44526, Aug. 19, 1998, unless otherwise noted.

### § 141.151 Purpose and applicability of this subpart.

- (a) This subpart establishes the minimum requirements for the content of reports that community water systems must deliver to their customers. These reports must contain information on the quality of the water delivered by the systems and characterize the risks (if any) from exposure to contaminants detected in the drinking water in an accurate and understandable manner. This subpart also includes requirements for systems serving more than 100,000 persons to develop and annually update a plan for providing assistance to consumers with limited English proficiency.
- (b) Notwithstanding the provisions of § 141.3, this subpart applies only to community water systems.
- (c) For the purpose of this subpart, *customers* are defined as billing units or service connections to which water is delivered by a community water system. For the purposes of this subpart, *consumers* are defined as people served by the water system, including customers, and people that do not receive a bill.
- (d) For the purpose of this subpart, detected means: at or above the levels prescribed by § 141.23(a)(4) for inorganic contaminants, at or above the levels prescribed by § 141.24(f)(7) for the contaminants listed in § 141.61(a), at or above the levels prescribed by § 141.24(h)(18) for the contaminants listed in § 141.61(c) (except PFAS), at or above the levels prescribed by § 141.131(b)(2)(iv) for the contaminants or contaminant groups listed in § 141.64, at or above the levels prescribed by § 141.25(c) for radioactive contaminants, and at or above the levels prescribed in § 141.902(a)(5) for PFAS listed in § 141.61(c).
- (e) A State that has primary enforcement responsibility may adopt by rule, after notice and comment, alternative requirements for the form and content of the reports. The alternative requirements must provide the same type and amount of information as required by §§ 141.153 and 141.154, and must be designed to achieve an equivalent level of public information and education as would be achieved under this subpart.
- (f) For purpose of this subpart, the term “primacy agency” refers to the State or Tribal government entity that has jurisdiction over, and primary enforcement responsibility for, public water systems, even if that government does not have interim or final primary enforcement responsibility for this part. Where the State or tribe does not have primary enforcement responsibility for public water systems, the term “primacy agency” refers to the appropriate EPA regional office.

[63 FR 44526, Aug. 19, 1998, as amended at 71 FR 483, Jan. 4, 2006; 89 FR 46008, May 24, 2024; 89 FR 32746, Apr. 26, 2024]

### § 141.152 Compliance dates.

- (a) Between June 24, 2024, and December 31, 2026, community water systems must comply with 40 CFR 141.151 through 141.155 (except § 141.153(d)(4)(xii)), as codified on July 1, 2023. Beginning January 1, 2027, community water systems must comply with 40 CFR 141.151 through 141.156 (except § 141.153(8)(h)(i)), as codified on July 1, 2024. Beginning November 1, 2027, community water systems must comply with 40 CFR 141.151 through 141.156, as codified on July 1, 2025.
- (b) Each existing community water system must deliver reports according to § 141.155 by July 1 each year. Each report delivered by July 1 must contain data collected during the previous calendar year, or the most recent calendar year before the previous calendar year.
- (c) A new community water system must deliver its first report by July 1 of the year after its first full calendar year in operation.

- (d) A community water system that sells water to another community water system must deliver the applicable information required in § 141.153 to the buyer system:
  - (1) By April 1, 2027, and annually thereafter; or
  - (2) On a date mutually agreed upon by the seller and the purchaser, and specifically included in a contract between the parties; and
  - (3) A community water system that sells water to another community water system that is required to provide reports biannually according to § 141.155(i) must provide the applicable information required in § 141.155(j) by October 1, 2027, to the buyer system, and annually thereafter, or a date mutually agreed upon by the seller and the purchaser, included in a contract between the parties.

[63 FR 44526, Aug. 19, 1998, as amended at 89 FR 46008, May 24, 2024; 89 FR 86662, Oct. 30, 2024]

### § 141.153 Content of the reports.

- (a) Each community water system must provide to its customers a report(s) that contains the information specified in this section, § 141.154, and include a summary as specified in § 141.156.
- (b) Information on the source of the water delivered:
  - (1) Each report must identify the source(s) of the water delivered by the community water system by providing information on:
    - (i) The type of the water: e.g., surface water, ground water; and
    - (ii) The commonly used name (if any) and location of the body (or bodies) of water.
  - (2) If a source water assessment has been completed, the report must notify consumers of the availability of this information, the year it was completed or most recently updated, and the means to obtain it. In addition, systems are encouraged to highlight in the report significant sources of contamination in the source water area if they have readily available information. Where a system has received a source water assessment from the primacy agency, the report must include a brief summary of the system's susceptibility to potential sources of contamination, using language provided by the primacy agency or written by the operator.
- (c) **Definitions.**
  - (1) Each report must include the following definitions:
    - (i) **Maximum Contaminant Level Goal or MCLG:** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
    - (ii) **Maximum Contaminant Level or MCL:** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
    - (iii) **Contaminant:** Any physical, chemical, biological, or radiological substance or matter in water.
  - (2) A report for a community water system operating under a variance or an exemption issued under § 1415 or 1416 of SDWA must include the following definition: *Variances and Exemptions:* State or EPA permission not to meet an MCL or a treatment technique under certain conditions.

- (3) A report that contains data on contaminants that EPA regulates using any of the following terms must include the applicable definitions:
  - (i) **Treatment Technique:** A required process intended to reduce the level of a contaminant in drinking water.
  - (ii) **Action Level:** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
  - (iii) **Maximum residual disinfectant level goal or MRDLG:** The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
  - (iv) **Maximum residual disinfectant level or MRDL:** The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
  - (v) **Hazard Index or HI.** The Hazard Index is an approach that determines the health concerns associated with mixtures of certain PFAS in finished drinking water. Low levels of multiple PFAS that individually would not likely result in adverse health effects may pose health concerns when combined in a mixture. The Hazard Index MCL represents the maximum level for mixtures of PFHxS, PFNA, HFPO-DA, and/or PFBS allowed in water delivered by a public water system. A Hazard Index greater than 1 requires a system to take action.
- (4) A report that contains information regarding a Level 1 or Level 2 Assessment required under Subpart Y of this part must include the applicable definitions:
  - (i) **Level 1 Assessment:** A Level 1 assessment is a study of the water system to identify potential problems and determine (if possible) why total coliform bacteria have been found in our water system.
  - (ii) **Level 2 Assessment:** A Level 2 assessment is a very detailed study of the water system to identify potential problems and determine (if possible) why an *E. coli* MCL violation has occurred and/or why total coliform bacteria have been found in our water system on multiple occasions.
- (5) Systems must use the following definitions for the terms listed below if the terms are used in the report unless the system obtains written approval from the state to use an alternate definition:
  - (i) **Pesticide:** Generally, any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest.
  - (ii) **Herbicide:** Any chemical(s) used to control undesirable vegetation.
- (d) **Information on detected contaminants.**
  - (1) This sub-section specifies the requirements for information to be included in each report for contaminants subject to mandatory monitoring (except *Cryptosporidium*). It applies to:
    - (i) Contaminants subject to a MCL, action level, maximum residual disinfectant level, or treatment technique (regulated contaminants); and
    - (ii) Contaminants for which monitoring is required by § 141.40 (unregulated contaminants).

- (2) The data relating to these contaminants must be presented in the reports in a manner that is clear and understandable for consumers. For example, the data may be displayed in one table or in several adjacent tables. Any additional monitoring results which a community water system chooses to include in its report must be displayed separately.
- (3) The data must be derived from data collected to comply with EPA and State monitoring and analytical requirements during the previous calendar year, or the most recent calendar year before the previous calendar year except that:
  - (i) Where a system is allowed to monitor for regulated contaminants less often than once a year, the contaminant data section must include the date and results of the most recent sampling and the report must include a brief statement indicating that the data presented in the report are from the most recent testing done in accordance with the regulations. No data older than 5 years need be included.
  - (ii) [Reserved]
- (4) For each detected regulated contaminant (listed in appendix A to this subpart), the contaminant data section(s) must contain:
  - (i) The MCL for that contaminant expressed as a number equal to or greater than 1.0 (as provided in appendix A to this subpart);
  - (ii) The MCLG for that contaminant expressed in the same units as the MCL;
  - (iii) If there is no MCL for a detected contaminant, the contaminant data section(s) must indicate that there is a treatment technique, or specify the action level, applicable to that contaminant, and the report must include the definitions for treatment technique and/or action level, as appropriate, specified in paragraph (c)(3) of this section;
  - (iv) For contaminants subject to an MCL, except turbidity and *E. coli*, the contaminant data section(s) must contain the highest contaminant level used to determine compliance with an NPDWR and the range of detected levels, as follows:
    - (A) When compliance with the MCL is determined annually or less frequently: The highest detected level at any sampling point and the range of detected levels expressed in the same units as the MCL.
    - (B) When compliance with the MCL is determined by calculating a running annual average of all samples taken at a monitoring location: the highest average of any of the monitoring locations and the range of individual sample results for all monitoring locations expressed in the same units as the MCL. For the MCLs for TTHM and HAA5 in § 141.64(b)(2), systems must include the highest locational running annual average for TTHM and HAA5 and the range of individual sample results for all monitoring locations expressed in the same units as the MCL. If more than one location exceeds the TTHM or HAA5 MCL, the system must include the locational running annual averages for all locations that exceed the MCL.

Note to paragraph (d)(4)(iv): When rounding of results to determine compliance with the MCL is allowed by the regulations, rounding should be done prior to multiplying the results by the factor listed in appendix A of this subpart.



- (v) For turbidity.
    - (A) When it is reported pursuant to § 141.13: The highest average monthly value.
    - (B) When it is reported pursuant to the requirements of § 141.71: the highest monthly value. The report should include an explanation of the reasons for measuring turbidity.
    - (C) When it is reported pursuant to § 141.73 or § 141.173 or § 141.551: the highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in § 141.73 or § 141.173, or § 141.551 for the filtration technology being used. The report should include an explanation of the reasons for measuring turbidity;
  - (vi) For lead and copper: the 90th percentile concentration of the most recent round(s) of sampling, the number of sampling sites exceeding the action level, and the range of tap sampling results;
  - (vii)-(viii) [Reserved]
  - (ix) The likely source(s) of detected contaminants to the best of the operator's knowledge. Specific information regarding contaminants may be available in sanitary surveys and source water assessments, and should be used when available to the operator. If the operator lacks specific information on the likely source, the report must include one or more of the typical sources for that contaminant listed in appendix A to this subpart that is most applicable to the system; and
  - (x) For *E. coli* analytical results under subpart Y: The total number of *E. coli* positive samples;
- (5) If a community water system distributes water to its customers from multiple hydraulically independent distribution systems that are fed by different raw water sources, the contaminant data section(s) should differentiate contaminant data for each service area and the report should identify each separate distribution system. For example, if displayed in a table, it should contain a separate column for each service area. Alternatively, systems could produce separate reports tailored to include data for each service area.
  - (6) The detected contaminant data section(s) must clearly identify any data indicating violations of MCLs, MRDLs, or treatment techniques, and the report must contain a clear and readily understandable explanation of the violation including: the length of the violation, the potential adverse health effects, and actions taken by the system to address the violation. To describe the potential health effects, the system must use the relevant language of appendix A to this subpart.
  - (7) For detected unregulated contaminants for which monitoring is required, the reports must present the average and range at which the contaminant was detected. The report must include a brief explanation of the reasons for monitoring for unregulated contaminants such as:
    - (i) Unregulated contaminant monitoring helps EPA to determine where certain contaminants occur and whether the Agency should consider regulating those contaminants in the future.
    - (ii) May use an alternative educational statement in the CCR if approved by the Primacy Agency.
  - (8) For systems that exceeded the lead action level in § 141.80(c), the detected contaminant data section must clearly identify the exceedance if any corrective action has been required by the Administrator or the State during the monitoring period covered by the report. The report must include a clear and readily understandable explanation of the exceedance, the steps consumers can take to reduce their exposure to lead in drinking water, and a description of any corrective actions the system has or will take to address the exceedance.

- (e) Information on *Cryptosporidium*, radon, and other contaminants:
- (1) If the system has performed any monitoring for *Cryptosporidium* which indicates that *Cryptosporidium* may be present in the source water or the finished water, the report must include:
    - (i) A summary of the results of the monitoring; and
    - (ii) An explanation of the significance of the results.
  - (2) If the system has performed any monitoring for radon which indicates that radon may be present in the finished water, the report must include:
    - (i) The results of the monitoring; and
    - (ii) An explanation of the significance of the results.
  - (3) If the system has performed additional monitoring which indicates the presence of other contaminants in the finished water, EPA strongly encourages systems to report any results which may indicate a health concern. To determine if results may indicate a health concern, EPA recommends that systems find out if EPA has proposed an NPDWR or issued a health advisory for that contaminant by contacting the Agency by calling the Safe Drinking Water Hotline (800-426-4791) or an alternative method identified on the website [epa.gov/safewater](http://epa.gov/safewater). EPA considers detects above a proposed MCL or health advisory level to indicate possible health concerns. For such contaminants, EPA recommends that the report include:
    - (i) The results of the monitoring; and
    - (ii) An explanation of the significance of the results noting the existence of a health advisory or a proposed regulation.
- (f) Compliance with NPDWR. In addition to the requirements of paragraph (d)(6) of this section, the report must note any violation that occurred during the period covered by the report of a requirement listed below, and include a clear and readily understandable explanation of the violation, any potential adverse health effects, and the steps the system has taken to correct the violation.
- (1) Monitoring and reporting of compliance data;
  - (2) Filtration and disinfection prescribed by subpart H of this part. For systems which have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of such equipment or processes which constitutes a violation, the report must include the following language as part of the explanation of potential adverse health effects: Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
  - (3) Lead and copper control requirements prescribed by subpart I of this part. For systems that fail to take one or more actions prescribed by §§ 141.80 through 141.93, the report must include the applicable language of appendix A to this subpart for lead, copper, or both.
  - (4) Treatment techniques for Acrylamide and Epichlorohydrin prescribed by subpart K of this part. For systems that violate the requirements of subpart K of this part, the report must include the relevant language from appendix A to this subpart.
  - (5) Recordkeeping of compliance data.
  - (6) Special monitoring requirements prescribed by §§ 141.40 and 141.41; and

- (7) Violation of the terms of a variance, an exemption, or an administrative or judicial order.
- (g) Variances and Exemptions. If a system is operating under the terms of a variance or an exemption issued under § 1415 or 1416 of SDWA, the report must contain:
  - (1) An explanation of the reasons for the variance or exemption;
  - (2) The date on which the variance or exemption was issued;
  - (3) A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption; and
  - (4) A notice of any opportunity for public input in the review, or renewal, of the variance or exemption.
- (h) Additional information:
  - (1) The report must contain a brief explanation regarding contaminants which may reasonably be expected to be found in drinking water including bottled water. This explanation may include the language of paragraphs (h)(1)(i) through (iii) of this section or systems may use their own comparable language. The report also must include the language of paragraph (h)(1)(iv) of this section.
    - (i) Both tap water and bottled water come from rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material. The water can also pick up and transport substances resulting from the presence of animals or from human activity. These substances are also called contaminants.
    - (ii) Contaminants are any physical, chemical, biological, or radiological substance or matter in water. Contaminants that may be present in source water include:
      - (A) **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
      - (B) **Inorganic contaminants**, such as salts and metals, which can occur naturally in the soil or groundwater or may result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
      - (C) **Pesticides and herbicides**, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
      - (D) **Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.
      - (E) **Radioactive contaminants**, which can occur naturally or be the result of oil and gas production and mining activities.
    - (iii) To protect public health, the Environmental Protection Agency prescribes regulations which limit the amount of certain contaminants in tap water provided by public water systems. The Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

- (iv) Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily mean that water poses a health risk. More information about contaminants and potential health effects can be obtained by contacting the Environmental Protection Agency by calling the Safe Drinking Water Hotline (800-426-4791) or visiting the website [epa.gov/safewater](http://epa.gov/safewater).
- (2) The report must include the telephone number of the owner, operator, or designee of the community water system as a source of additional information concerning the report. If a system uses a website or social media to share additional information, EPA recommends including information about how to access such media platforms in the report.
- (3) In communities with a large proportion of consumers with limited English proficiency, as determined by the Primacy Agency, the report must contain information in the appropriate language(s) regarding the importance of the report and either contain information where such consumers may obtain a translated copy of the report, or assistance in the appropriate language(s), or the report must be in the appropriate language(s).
- (4) The report must include information (e.g., time and place of regularly scheduled board meetings) about opportunities for public participation in decisions that may affect the quality of the water.
- (5) The systems may include such additional information as they deem necessary for public education consistent with, and not detracting from, the purpose of the report.
- (6) Systems required to comply with subpart S of this part.
  - (i) Any ground water system that receives notice from the State of a significant deficiency or notice from a laboratory of a fecal indicator-positive ground water source sample that is not invalidated by the State under § 141.402(d) must inform its customers of any significant deficiency that is uncorrected at the time of the next reporting period or of any fecal indicator-positive ground water source sample in the next report or 6-month update according to § 141.155. The system must continue to inform the public annually until the State determines that particular significant deficiency is corrected or the fecal contamination in the ground water source is addressed under § 141.403(a). Each report must include the following elements:
    - (A) The nature of the particular significant deficiency or the source of the fecal contamination (if the source is known) and the date the significant deficiency was identified by the State or the dates of the fecal indicator-positive ground water source samples;
    - (B) If the fecal contamination in the ground water source has been addressed under § 141.403(a) and the date of such action;
    - (C) For each significant deficiency or fecal contamination in the ground water source that has not been addressed under § 141.403(a), the State-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed; and
    - (D) If the system receives notice of a fecal indicator-positive ground water source sample that is not invalidated by the State under § 141.402(d), the potential health effects using the health effects language of appendix A to this subpart.
  - (ii) If directed by the State, a system with significant deficiencies that have been corrected before the next report is issued must inform its customers of the significant deficiency, how the deficiency was corrected, and the date of correction under paragraph (h)(6)(i) of this section.

(7) Systems required to comply with subpart Y of this part.

- (i) Any system required to comply with the Level 1 assessment requirement or a Level 2 assessment requirement that is not due to an *E. coli* MCL violation must include in the report the text found in paragraphs (h)(7)(i)(A) through (C) of this section as appropriate, filling in the blanks accordingly and the text found in paragraphs (h)(7)(i)(D)(1) and (2) of this section if appropriate. Systems may use an alternative statement with equivalent information for paragraphs (h)(7)(i)(B) and (C) of this section if approved by the primacy agency.
  - (A) Coliforms are bacteria that occur naturally in the environment and are used as an indicator that other, potentially harmful, waterborne organisms may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system. We found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessment(s) to identify problems and to correct any problems that were found during these assessments.
  - (B) Because we found coliforms during sampling, we were required to conduct [INSERT NUMBER OF LEVEL 1 ASSESSMENTS] assessment(s) of the system, also known as a Level 1 assessment, to identify possible sources of contamination. [INSERT NUMBER OF LEVEL 1 ASSESSMENTS] Level 1 assessment(s) were completed. In addition, we were required to take [INSERT NUMBER OF CORRECTIVE ACTIONS] corrective actions and we completed [INSERT NUMBER OF CORRECTIVE ACTIONS] of these actions.
  - (C) Because we found coliforms during sampling, we were required to conduct [INSERT NUMBER OF LEVEL 2 ASSESSMENTS] detailed assessments, also known as a Level 2 assessment, to identify possible sources of contamination. [INSERT NUMBER OF LEVEL 2 ASSESSMENTS] Level 2 assessments were completed. In addition, we were required to take [INSERT NUMBER OF CORRECTIVE ACTIONS] corrective actions and we completed [INSERT NUMBER OF CORRECTIVE ACTIONS] of these actions.
  - (D) Any system that has failed to complete all the required assessments or correct all identified sanitary defects, is in violation of the treatment technique requirement and must also include one or both of the following statements, as appropriate:
    - (1) During the past year we failed to conduct all the required assessment(s).
    - (2) During the past year we failed to correct all identified defects that were found during the assessment.
- (ii) Any system required to conduct a Level 2 assessment due to an *E. coli* MCL violation must include in the report the text found in paragraphs (h)(7)(ii)(A) and (B) of this section, and health effects language in appendix A to this subpart, filling in the blanks accordingly and the text found in paragraphs (h)(7)(ii)(C)(1) and (2) of this section, if appropriate. Systems may use an alternative statement with equivalent information for paragraphs (h)(7)(ii)(A) through (C) of this section, if approved by the primacy agency.
  - (A) We found *E. coli* bacteria, indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessment(s), also known as a Level 2 assessment, to identify problems and to correct any problems that were found during these assessments.

- (B) We were required to complete a detailed assessment of our water system, also known as a Level 2 assessment, because we found *E. coli* in our water system. In addition, we were required to take [INSERT NUMBER OF CORRECTIVE ACTIONS] corrective actions and we completed [INSERT NUMBER OF CORRECTIVE ACTIONS] of these actions.
  - (C) Any system that has failed to complete the required assessment or correct all identified sanitary defects, is in violation of the treatment technique requirement and must also include one or both of the following statements, as appropriate:
    - (1) We failed to conduct the required assessment.
    - (2) We failed to correct all defects that were identified during the assessment that we conducted.
  - (iii) If a system detects *E. coli* and has violated the *E. coli* MCL, in addition to completing the table as required in paragraph (d)(4) of this section, the system must include one or more of the following statements to describe any noncompliance, as applicable:
    - (A) We had an *E. coli*-positive repeat sample following a total coliform-positive routine sample.
    - (B) We had a total coliform-positive repeat sample following an *E. coli*-positive routine sample.
    - (C) We failed to take all required repeat samples following an *E. coli*-positive routine sample.
    - (D) We failed to test for *E. coli* when any repeat sample tested positive for total coliform.
  - (iv) If a system detects *E. coli* and has not violated the *E. coli* MCL, in addition to completing the table as required in paragraph (d)(4) of this section, the system may include a statement that explains that although they have detected *E. coli*, they are not in violation of the *E. coli* MCL.
- (8) Systems required to comply with subpart I of this part.
- (i) The report must notify consumers that complete lead tap sampling data are available for review and must include information on how to access the data.
  - (ii) The report must include a statement that a service line inventory (including inventories where the publicly accessible inventory consists of a written statement that there are no lead, galvanized requiring replacement, or lead status unknown service lines, known lead connectors or connectors of unknown material) has been prepared and include instructions to access the publicly accessible service line inventory. If the service line inventory is available online, the report must include the direct link to the inventory.
  - (iii) For systems with lead, galvanized requiring replacement, or lead status unknown service lines in the system's inventory pursuant to § 141.84(a) and (b), the report must include information on how to obtain a copy of the service line replacement plan or a direct link to the plan if the system is required to make the service line replacement plan available online.
  - (iv) The report must contain a plainly worded explanation of the corrosion control efforts the system is taking in accordance with subpart I of this part. Corrosion control efforts consist of treatment (e.g., pH adjustment, alkalinity adjustment, or corrosion inhibitor addition) and other efforts contributing to the control of the corrosivity of water (e.g., monitoring to assess the corrosivity of water). The system may use one of the following templates or use their own explanation that includes equivalent information.
    - (A) For systems with State or EPA-designated Optimal Corrosion Control Treatment:

- (1) Corrosion of pipes, plumbing fittings, and fixtures may cause lead and copper to enter drinking water. To assess corrosion of lead and copper, [name of system] conducts tap sampling for lead and copper at selected sites [insert frequency at which system conducts tap sampling]. [Name of system] treats water using [identify treatment method] to control corrosion, which was designated as the optimal corrosion control treatment by [the State or EPA, as applicable]. To ensure the treatment is operating effectively, [name of system] monitors water quality parameters set by the [the State or EPA, as applicable] [insert frequency at which system conducts water quality parameter monitoring].
  - (2) If applicable add: [Name of system] is currently conducting a study of corrosion control to determine if any changes to treatment methods are needed to minimize the corrosivity of the water.
- (B) For systems without State or EPA designated Optimal Corrosion Control Treatment:
- (1) Corrosion of pipes, plumbing fittings and fixtures may cause metals, including lead and copper, to enter drinking water. To assess corrosion of lead and copper, [name of system] conducts tap sampling for lead and copper at selected sites [insert frequency at which system conducts tap sampling].
  - (2) If applicable, add: [Name of system] treats water using [identify treatment method] to control corrosion.
  - (3) If applicable add: [Name of system] is currently conducting a study of corrosion control to determine if any changes to treatment methods are needed to minimize the corrosivity of the water.
- (v) The report must include a statement that the water system is required to sample for lead in schools and licensed child care facilities as requested by the facility and that directs the public to contact their school or child care facility for further information about potential sampling results.

[63 FR 44526, Aug. 19, 1998, as amended at 63 FR 69516, Dec. 16, 1998; 64 FR 34733, June 29, 1999; 65 FR 26022, May 4, 2000; 67 FR 1836, Jan. 14, 2002; 71 FR 483, Jan. 4, 2006; 71 FR 65651, Nov. 8, 2006; 78 FR 10348, Feb. 13, 2013; 86 FR 4309, Jan. 15, 2021; 89 FR 32746, Apr. 26, 2024; 89 FR 46008, May 24, 2024; 89 FR 86662, Oct. 30, 2024]

#### **§ 141.154 Required additional health information.**

- (a) All reports must prominently display the following language: Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791) or on EPA's website [epa.gov/safewater](https://www.epa.gov/safewater).
- (b) A system that detects arsenic above 0.005 mg/L and up to and including 0.010 mg/L:

- (1) Must include in its report a short informational statement about arsenic, using language such as: Arsenic is known to cause cancer in humans. Arsenic also may cause other health effects such as skin damage and circulatory problems. [NAME OF UTILITY] meets the EPA arsenic drinking water standard, also known as a Maximum Contaminant Level (MCL). However, you should know that EPA's MCL for arsenic balances the scientific community's understanding of arsenic-related health effects and the cost of removing arsenic from drinking water. The highest concentration of arsenic found in [YEAR] was [INSERT MAX ARSENIC LEVEL per § 141.153(d)(4)(iv)] ppb.
  - (2) May use an alternative educational statement in the CCR if approved by the Primacy Agency.
- (c) A system which detects nitrate at levels above 5 mg/l, but below the MCL:
- (1) Must include a short informational statement about the impacts of nitrate on children using language such as: Even though [NAME OF UTILITY] meets the EPA nitrate drinking water standard, also known as a Maximum Contaminant Level (MCL), if you are caring for an infant and using tap water to prepare formula, you may want to use alternate sources of water or ask for advice from your health care provider. Nitrate levels above 10 ppm pose a particularly high health concern for infants under 6 months of age and can interfere with the capacity of the infant's blood to carry oxygen, resulting in a serious illness. Symptoms of serious illness include shortness of breath and blueness of the skin, known as "blue baby syndrome." Nitrate levels in drinking water can increase for short periods of time due to high levels of rainfall or agricultural activity, therefore we test for nitrate [INSERT APPLICABLE SAMPLING FREQUENCY]. The highest level for nitrate found during [YEAR] was [INSERT MAX NITRATE LEVEL per § 141.153(d)(4)(iv)] ppm.
  - (2) May use an alternative educational statement in the CCR if approved by the Primacy Agency.
- (d) Every report must include the following lead-specific information:
- (1) A short informational statement about lead in drinking water and its effects on children. The statement must include the information in figure 1 to this paragraph (d)(1):

### Figure 1 to Paragraph (d)(1)

Lead can cause serious health effects in people of all ages, especially pregnant people, infants (both formula-fed and breastfed), and young children. Lead in drinking water is primarily from materials and parts used in service lines and in home plumbing. [INSERT NAME OF SYSTEM] is responsible for providing high quality drinking water and removing lead pipes but cannot control the variety of materials used in the plumbing in your home. Because lead levels may vary over time, lead exposure is possible even when your tap sampling results do not detect lead at one point in time. You can help protect yourself and your family by identifying and removing lead materials within your home plumbing and taking steps to reduce your family's risk. Using a filter, certified by an American National Standards Institute accredited certifier to reduce lead, is effective in reducing lead exposures. Follow the instructions provided with the filter to ensure the filter is used properly. Use only cold water for drinking, cooking, and making baby formula. Boiling water does not remove lead from water. Before using tap water for drinking, cooking, or making baby formula, flush your pipes for several minutes. You can do this by running your tap, taking a shower, doing laundry or a load of dishes. If you have a lead service line or galvanized requiring replacement service line, you may need to flush your pipes for a longer period. If you are concerned about lead in your water and wish to



have your water tested, contact [INSERT NAME OF SYSTEM and CONTACT INFORMATION]. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available at <https://www.epa.gov/safewater/lead>.

- (2) May use an alternative educational statement in the CCR if approved by the Primacy Agency.

[63 FR 44526, Aug. 19, 1998, as amended at 63 FR 69475, Dec. 16, 1998; 64 FR 34733, June 29, 1999; 65 FR 26023, May 4, 2000; 66 FR 7064, Jan. 22, 2001; 68 FR 14506, Mar. 25, 2003; 72 FR 57820, Oct. 10, 2007; 86 FR 4309, Jan. 15, 2021; 89 FR 46011, May 24, 2024; 89 FR 86662, Oct. 30, 2024]

### § 141.155 Report delivery, reporting, and recordkeeping.

- (a) Except as provided in paragraph (g) of this section, each community water system must directly deliver a copy of the report to each customer.

- (1) Systems must use at a minimum, one of the following forms of delivery:

- (i) Mail or hand deliver a paper copy of the report;
- (ii) Mail a notification that the report is available on a website via a direct link;
- (iii) Email a direct link or electronic version of the report; or
- (iv) Another direct delivery method approved in writing by the primacy agency.

- (2) Systems using electronic delivery methods in paragraph (a)(1)(ii), (iii), or (iv) of this section must provide a paper copy of the report to any customer upon request. The notification method must prominently display directions for requesting such copy.

- (3) For systems that choose to electronically deliver the reports by posting the report to a website and providing a notification either by mail or email:

- (i) The report must be publicly available on the website at time notification is made;
- (ii) Notifications must prominently display the link and include an explanation of the nature of the link; and
- (iii) Systems may use a web page to convey the information required in §§ 141.153, 141.154, and 141.156.

- (4) Systems that use a publicly available website to provide reports must maintain public access to the report for no less than 3 years.

(b) The system must make a good faith effort to reach consumers who do not get water bills, using means recommended by the primacy agency. EPA expects that an adequate good faith effort will be tailored to the consumers who are served by the system but are not bill-paying customers, such as renters or workers. A good faith effort to reach consumers includes a mix of methods to reach the broadest possible range of persons served by the water system such as, but not limited to: Posting the reports on the internet; mailing reports or postcards with links to the reports to all service addresses and/or postal customers; using an opt in notification system to send emails and/or texts with links to the reports to interested consumers; advertising the availability of the report in the news media and on social media; publication in a local newspaper or newsletter; posting a copy of the report or notice of availability with links (or equivalent, such as Quick Response (QR) codes) in public

places such as cafeterias or lunch rooms of public buildings; delivery of multiple copies for distribution by single-biller customers such as apartment buildings or large private employers; delivery to community organizations; holding a public meeting to educate consumers on the reports.

- (i) Where a system is aware that it serves a substantial number of non-bill paying consumers, the system is encouraged to directly deliver the reports or notices of availability of the reports to service addresses.
  - (ii) Where a system is aware of a substantial number of bill-paying consumers without access to electronic forms of the report, the system should use at least one non-electronic form of delivery.
- (c) No later than 10 days after the date the system is required to distribute the report to its customers, each community water system must provide a copy of the report to the primacy agency and a certification that the report(s) has/have been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to the primacy agency.
- (d) No later than the date the system is required to distribute the report to its customers, each community water system must deliver the report to any other agency or clearinghouse identified by the primacy agency.
- (e) Each community water system must make its reports available to the public upon request. Systems should make a reasonable effort to provide the reports in an accessible format to anyone who requests an accommodation.
- (f) Each community water system serving 50,000 or more persons must post its current year's report to a publicly-accessible site on the internet.
- (g) The Governor of a State or their designee, or the Tribal Leader where the Tribe has met the eligibility requirements contained in § 142.72 for the purposes of waiving the mailing requirement, can waive the requirement of paragraph (a) of this section for community water systems serving fewer than 10,000 persons. In consultation with the tribal government, the Regional Administrator may waive the requirement of § 141.155(a) in areas in Indian country where no tribe has been deemed eligible.
  - (1) Such systems must:
    - (i) Publish the reports in one or more local newspapers or on one or more local online news sites serving the area in which the system is located;
    - (ii) Inform the customers that the reports will not be mailed, either in the newspapers in which the reports are published or by other means approved by the State; and
    - (iii) Make the reports available to the public upon request.
  - (2) Systems serving 500 or fewer persons may forego the requirements of paragraphs (g)(1)(i) and (ii) of this section if they provide notice that the report is available upon request at least once per year to their customers by mail, door-to-door delivery or by posting in one or more locations where persons served by the system can reasonably be expected to see it.
- (h) Any system subject to this subpart must retain copies of its Consumer Confidence Report for no less than 3 years.

- (i) Systems serving 100,000 or more persons, must develop a plan for providing assistance to consumers with limited English proficiency. The system must evaluate the languages spoken by persons with limited English proficiency served by the water system, and the system's anticipated approach to address translation needs. The first plan must be provided to the state with the first report in 2027. Plans must be evaluated annually and updated as necessary and reported with the certification required in paragraph (c) of this section.
- (j) Delivery timing and biannual delivery:
  - (1) Each community water system must distribute reports by July 1 each year. Each report distributed by July 1 must use data collected during, or prior to, the previous calendar year using methods described in paragraph (a) of this section.
  - (2) Each community water system serving 10,000 or more persons must distribute the report biannually, or twice per calendar year, by December 31 using methods described in paragraph (a) of this section.
  - (3) Systems required to comply with paragraph (j)(2) of this section, with a violation or action level exceedance that occurred between January 1 and June 30 of the current year, or have received monitoring results from required monitoring under the Unregulated Contaminant Monitoring Rule in § 141.40, must include a 6-month update with the second report with the following:
    - (i) A short description of the nature of the 6-month update and the biannual delivery.
    - (ii) If a system receives an MCL, MRDL, or treatment technique violation, the 6-month update must include the applicable contaminant section information in § 141.153(d)(4), and a readily understandable explanation of the violation including: the length of the violation, the potential adverse health effects, actions taken by the system to address the violation, and timeframe the system expects to complete those actions. To describe the potential health effects, the system must use the relevant language of appendix A to this subpart.
    - (iii) If a system receives any other violation, the 6-month update must include the information in § 141.153(f).
    - (iv) If a system exceeded the lead action level following monitoring conducted between January 1 and June 30 of the current year, the system must include information identified in § 141.153(d)(4)(vi) and (d)(8).
    - (v) For systems monitoring under § 141.40 that become aware of results for samples collected during the reporting year but were not included in the reports distributed by July 1, the system must include information as required by § 141.153(d)(7).
  - (i) Systems serving 100,000 or more persons, must develop a plan for providing assistance to consumers with limited English proficiency. The system must evaluate the languages spoken by persons with limited English proficiency served by the water system, and the system's anticipated approach to address translation needs. The first plan must be provided to the state with the first report in 2027. Plans must be evaluated annually and updated as necessary and reported with the certification required in paragraph (c) of this section.
- (j) Delivery timing and biannual delivery:

- (1) Each community water system must distribute reports by July 1 each year. Each report distributed by July 1 must use data collected during, or prior to, the previous calendar year using methods described in paragraph (a) of this section.
- (2) Each community water system serving 10,000 or more persons must distribute the report biannually, or twice per calendar year, by December 31 using methods described in paragraph (a) of this section.
- (3) Systems required to comply with paragraph (j)(2) of this section, with a violation or action level exceedance that occurred between January 1 and June 30 of the current year, or have received monitoring results from required monitoring under the Unregulated Contaminant Monitoring Rule in § 141.40, must include a 6-month update with the second report with the following:
  - (i) A short description of the nature of the 6-month update and the biannual delivery.
  - (ii) If a system receives an MCL, MRDL, or treatment technique violation, the 6-month update must include the applicable contaminant section information in § 141.153(d)(4), and a readily understandable explanation of the violation including: the length of the violation, the potential adverse health effects, actions taken by the system to address the violation, and timeframe the system expects to complete those actions. To describe the potential health effects, the system must use the relevant language of appendix A to this subpart.
  - (iii) If a system receives any other violation, the 6-month update must include the information in § 141.153(f).
  - (iv) If a system exceeded the lead action level following monitoring conducted between January 1 and June 30 of the current year, the system must include information identified in § 141.153(d)(4)(vi) and (d)(8).
  - (v) For systems monitoring under § 141.40 that become aware of results for samples collected during the reporting year but were not included in the reports distributed by July 1, the system must include information as required by § 141.153(d)(7).

[63 FR 44526, Aug. 19, 1998, as amended at 65 FR 26023, May 4, 2000; 89 FR 46012, May 24, 2024]

### § 141.156 Summary of report contents.

- (a) Each report must include a summary displayed prominently at the beginning of the report, including a brief description of the nature of the report.
- (b) Systems must include, at a minimum, the following information in the summary:
  - (1) Summary of violations and compliance information included in the report required by § 141.153(d)(6) and (8), (f), and (h)(6) and (7).
  - (2) Contact information for owner, operator, or designee of the community water system as a source of additional information concerning the report, per § 141.153(h)(2).
- (c) If applicable, systems must include the following in the summary:
  - (1) For systems using delivery methods in § 141.155(a)(1)(ii), (iii), or (iv), the summary must include directions for consumers to request a paper copy of the report, as described in § 141.155(a)(2).

- (2) For systems subject to § 141.153(h)(3) because they serve a large proportion of consumers with limited English proficiency, the summary must include information where consumers may obtain a translated copy of the report, or get assistance in the appropriate language(s).
- (3) For systems using the report to also meet the public notification requirements of subpart Q of this part, the summary must specify that it is also serving to provide public notification of one or more violations or situations, provide a brief statement about the nature of the notice(s), and a brief description of how to locate the notice(s) in the report.
- (d) The summary should be written in plain language and may use infographics.
- (e) For those systems required to include a 6-month update with the second report under § 141.155(j)(2), the summary should include a brief description of the nature of the report and update, noting the availability of new information for the current year (between January and June).
- (f) The report summary must include the following standard language to encourage the distribution of the report to all persons served:

Please share this information with anyone who drinks this water (or their guardians), especially those who may not have received this report directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this report in a public place or distributing copies by hand, mail, email, or another method.

[89 FR 46013, May 24, 2024]

## Appendix A to Subpart O of Part 141—Regulated Contaminants

Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Microbiological contaminants:						
Total Coliform Bacteria	TT		TT		N/A	Use language found in § 141.153(h)(7)(i)(A).
<i>E. coli</i>	Routine and repeat samples are total coliform-positive and either is <i>E. coli</i> -positive or system fails to take repeat samples following <i>E. coli</i> -positive routine		Routine and repeat samples are total coliform-positive and either is <i>E. coli</i> -positive or system fails to take repeat samples following <i>E. coli</i> -positive routine	0	Human and animal fecal waste	<i>E. coli</i> are bacteria whose presence indicates that tap water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely-compromised immune systems.

Key:

AL = Action Level

MCL = Maximum Contaminant Level

MCLG = Maximum Contaminant Level Goal

MFL = million fibers per liter

MRDL = Maximum Residual Disinfectant Level

MRDLG = Maximum Residual Disinfectant Level Goal

mrem/year = millirems per year (a measure of radiation absorbed by the body)

N/A = Not Applicable

NTU = Nephelometric Turbidity Units (a measure of water clarity)

pCi/l = picocuries per liter (a measure of radioactivity)

ppm = parts per million, or milligrams per liter (mg/l)

ppb = parts per billion, or micrograms per liter (µg/l)

ppt = parts per trillion, or nanograms per liter

ppq = parts per quadrillion, or picograms per liter

TT = Treatment Technique

Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Fecal Indicators (enterococci or coliphage)	sample or system fails to analyze total coliform- positive repeat sample for <i>E. coli</i> TT		sample or system fails to analyze total coliform- positive repeat sample for <i>E. coli</i> TT	N/A	Human and animal fecal waste	Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Total organic carbon (ppm)	TT		TT	N/A	Naturally present in the environment	infants, young children, some of the elderly, and people with severely compromised immune systems. Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Turbidity (NTU)	TT		TT	N/A	Soil runoff	increased risk of getting cancer. Turbidity has no health effects. However, turbidity can interfere with disinfection and provide medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
Radioactive contaminants: Beta/photon emitters (mrem/yr)	4 mrem/yr	–	4	0	Decay of natural and man-made deposits	Certain minerals are radioactive and may emit forms of radiation known as photons and beta

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Alpha emitters (pCi/L)	15 pCi/L	–	15	0	Erosion of natural deposits	radiation. Some people who drink water containing beta particle and photon radioactivity in excess of the MCL over many years may have an increased risk of getting cancer. Certain minerals are radioactive and may emit form of radiation known as alpha radiation. Some people who drink water containing alpha emitter in excess of the MCL over many years may have an increased risk of getting cancer.
Combined radium (pCi/L)	5 pCi/L	–	5	0	Erosion of natural deposits	Some people who drink water containing radium-226 or -228 in excess of the MCL over many years may have an

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pCi/l = picocuries per liter (a measure of radioactivity)

ppm = parts per million, or milligrams per liter (mg/l)

ppb = parts per billion, or micrograms per liter (µg/l)

ppt = parts per trillion, or nanograms per liter

ppq = parts per quadrillion, or picograms per liter

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Uranium (pCi/L)	30 µg/L	–	30	0	Erosion of natural deposits	increased risk of getting cancer. Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity
Inorganic contaminants: Antimony (ppb)	.006	1000	6	6	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar
Arsenic (ppb)	0.010	1000	10	0	Erosion of natural deposits; Runoff from orchards; Runoff from	Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage and other health problems with their

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TT = Treatment Technique

Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Asbestos (MFL)	7 MFL		7	7	glass and electronics production wastes Decay of asbestos cement water mains; Erosion of natural deposits	circulatory system, and may have an increased risk of getting cancer.  Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.
Barium (ppm)	2		2	2	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits	Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
Beryllium (ppb)	.004	1000	4	4	Discharge from metal refineries and coal-	Some people who drink water containing beryllium in excess of the MCL

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Bromate (ppb)	.010	1000	10	0	burning factories; Discharge from electrical, aerospace, and defense industries By-product of drinking water disinfection	over many years could develop intestinal lesions  Some people who drink water of containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.
Cadmium (ppb)	.005	1000	5	5	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; Runoff from	Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Chloramines (ppm)	MRDL = 4		MRDL = 4	MRDLG = 4	waste batteries and paints Water additive used to control microbes	Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.
Chlorine (ppm)	MRDL = 4		MRDL = 4	MRDLG = 4	Water additive used to control microbes	Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Chlorine dioxide (ppb)	MRDL = .8	1000	MRDL = 800	MRDLG = 800	Water additive used to control microbes	the MRDL could experience stomach discomfort. Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.
Chlorite (ppm)	1		1	0.8	By-product of drinking water disinfection	Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Chromium (ppb)	.1	1000	100	100	Discharge from steel and pulp mills; Erosion of natural deposits	water containing chlorite excess of the MCL. Some people may experience anemia. Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.
Copper (ppm)	AL = 1.3		AL = 1.3	1.3	Corrosion of household plumbing systems; Erosion of natural deposits	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver o

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Cyanide (ppb)	.2	1000	200	200	Discharge from steel/metal factories; Discharge from plastic and fertilizer factories	kidney damage. People with Wilson's disease should consult their personal doctor. Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.
Fluoride (ppm)	4		4	4	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories	Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Fluoride in drinking water at half the MCL or more may cause mottling of children's teeth, usually in children less than nine

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Lead (mg/L)	AL = 0.010	1,000	AL = 10	0	Corrosion of household plumbing systems and service lines connecting buildings to water mains, erosion of natural deposits	years old. Mottling, also known as dental fluorosis may include brown stain and/or pitting of the teeth and occurs only in developing teeth before they erupt from the gums. There is no safe level of lead in drinking water. Exposure to lead in drinking water can cause serious health effects in age groups, especially pregnant people, infants (both formula-fed and breastfed), and young children. Some of the health effects to infants and children include decreases in IQ and attention span. Lead exposure can also result

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Mercury [inorganic] (ppb)	.002	1000	2	2	Erosion of natural deposits; Discharge from refineries and factories; Runoff from	new or worsened learning and behavior problems. The children of persons who are exposed to lead before or during pregnancy may be at increased risk of these harmful health effects. Adults have increased risks of heart disease, high blood pressure, kidney or nervous system problems. Contact your health care provider for more information about your risks. Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Nitrate (ppm)	10		10	10	landfills; Runoff from cropland Runoff from fertilizer use; Leaching from septic tanks, sew age; Erosion of natural deposits	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
Nitrite (ppm)	1		1	1	Runoff from fertilizer use; Leaching from septic tanks, sew age; Erosion of natural deposits	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
Selenium (ppb)	.05	1000	50	50	Discharge from	Selenium is an essential

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Thallium (ppb)	.002	1000	2	0.5	petroleum and metal refineries; Erosion of natural deposits; Discharge from mines  Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories	nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with the circulation.  Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.
Synthetic organic contaminants including pesticides and herbicides: 2,4-D (ppb)	.07	1000	70	70	Runoff from	Some people who drink

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2,4,5-TP [Silvex](ppb)	.05	1000	50	50	herbicide used on row crops  Residue of banned herbicide	water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands. Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems
Acrylamide	TT		TT	0	Added to water during sewage/ wastewater treatment	Some people who drink water containing high levels of acrylamide over long period of time could have problems with their nervous system or blood and may have an increased risk of getting cancer.
Alachlor (ppb)	.002	1000	2	0	Runoff from herbicide used	Some people who drink water containing alachlor

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Atrazine (ppb)	.003	1000	3	3	on row crops  Runoff from herbicide used on row crops	in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, could experience anemia, and may have an increased risk of getting cancer. Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.
Benzo(a)pyrene [PAH] (nanograms/l)	.0002	1,000,000	200	0	Leaching from linings of water storage tanks and distribution lines	Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.

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Carbofuran (ppb)	.04	1000	40	40	Leaching of soil fumigant used on rice and alfalfa	risk of getting cancer. Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.
Chlordane (ppb)	.002	1000	2	0	Residue of banned termiticide	Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.
Dalapon (ppb)	.2	1000	200	200	Runoff from herbicide used on rights of way	Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney

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Di(2-ethylhexyl) adipate (ppb)	.4	1000	400	400	Discharge from chemical factories	changes. Some people who drink water containing di(2-ethylhexyl) adipate well in excess of the MC over many years could experience toxic effects such as weight loss, liver enlargement or possible reproductive difficulties.
Di(2-ethylhexyl) phthalate (ppb)	.006	1000	6	0	Discharge from rubber and chemical factories	Some people who drink water containing di(2-ethylhexyl) phthalate well in excess of the MC over many years may have problems with their liver, experience reproductive difficulties, and may have an increased risk of getting cancer.
Dibromochloropropane (ppt)	.0002	1,000,000	200	0	Runoff/ leaching from	Some people who drink water containing DBCP in

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Dinoseb (ppb)	.007	1000	7	7	soil fumigant used on soybeans, cotton, pineapples, and orchards Runoff from herbicide used on soybeans and vegetables	excess of the MCL over many years could experience reproductive problems and may have increased risk of getting cancer. Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
Diquat (ppb)	.02	1000	20	20	Runoff from herbicide use	Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.
Dioxin [2,3,7,8-TCDD] (ppq)	.00000003	1,000,000,000	30	0	Emissions from waste incineration and other combustion;	Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive

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Endothall (ppb)	.1	1000	100	100	Discharge from chemical factories Runoff from herbicide use	difficulties and may have an increased risk of getting cancer. Some people who drink water containing endothal in excess of the MCL over many years could experience problems with their stomach or intestines
Endrin (ppb)	.002	1000	2	2	Residue of banned insecticide	Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems
Epichlorohydrin	TT		TT	0	Discharge from industrial chemical factories; An impurity of some water treatment chemicals	Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have increased risk of getting cancer.

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Ethylene dibromide (ppt)	.00005	1,000,000	50	0	Discharge from petroleum refineries	Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.
Glyphosate (ppb)	.7	1000	700	700	Runoff from herbicide use	Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.
Hazard Index PFAS (HFPO-DA, PFBS, PFHxS, and PFNA) (unitless)	1 (unitless)		1	1	Discharge from manufacturing and industrial chemical facilities, use	Per- and polyfluoroalkyl substances (PFAS) can persist in the human body and exposure may lead to an increased risk of adverse

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					of certain consumer products, occupational exposures, and certain firefighting activities	health effects. Low levels of multiple PFAS that individually would not likely result in increased risk of adverse health effects may result in adverse health effects when combined in a mixture. Some people who consume drinking water containing mixtures of PFAS in excess of the Hazard Index (HI) MCL may have increased health risks such as liver, immune, and thyroid effects following exposure over many years and developmental and thyroid effects following repeated exposure during pregnancy and/or childhood.
Heptachlor (ppt)	.0004	1,000,000	400	0	Residue of	Some people who drink

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Heptachlor epoxide (ppt)	.0002	1,000,000	200	0	banned pesticide  Breakdown of heptachlor	water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.  Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.
Hexachlorobenzene (ppb)	.001	1000	1	0	Discharge from metal refineries and agricultural chemical factories	Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or

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Hexachlorocyclopentadiene (ppb)	.05	1000	50	50	Discharge from chemical factories	adverse reproductive effects, and may have an increased risk of getting cancer. Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.
HFPO-DA (ng/l)	0.00001	1,000,000	10	10	Discharge from manufacturing and industrial chemical facilities, use of certain consumer products, occupational exposures, and certain	Some people who drink water containing HFPO-DA in excess of the MCL over many years may have increased health risks such as immune, liver, and kidney effects. There is also a potential concern cancer associated with HFPO-DA exposure. In addition, there may be

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Lindane (ppt)	.0002	1,000,000	200	200	firefighting activities Runoff/ leaching from insecticide used on cattle, lumber, gardens	increased risks of developmental effects for people who drink water containing HFPO-DA in excess of the MCL following repeated exposure during pregnancy and/or childhood. Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.
Methoxychlor (ppb)	.04	1000	40	40	Runoff/ leaching from insecticide used on fruits, vegetables, alfalfa, livestock	Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
Oxamyl [Vydate] (ppb)	.2	1000	200	200	Runoff/	Some people who drink

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mrem/year = millirems per year (a measure of radiation absorbed by the body)

N/A = Not Applicable

NTU = Nephelometric Turbidity Units (a measure of water clarity)

pCi/l = picocuries per liter (a measure of radioactivity)

ppm = parts per million, or milligrams per liter (mg/l)

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
PCBs [Polychlorinated biphenyls] (ppt)	.0005	1,000,000	500	0	leaching from insecticide used on apples, potatoes and tomatoes Runoff from landfills; Discharge of waste chemicals	water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.  Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in the skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.
Pentachlorophenol (ppb)	.001	1000	1	0	Discharge from wood preserving factories	Some people who drink water containing pentachlorophenol in excess of the MCL over

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
PFHxS (ng/l)	0.00001	1,000,000	10	10	Discharge from manufacturing and industrial chemical facilities, use of certain consumer products, occupational exposures, and certain firefighting activities	many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer. Some people who drink water containing PFHxS in excess of the MCL over many years may have increased health risks such as immune, thyroid, and liver effects. In addition, there may be increased risks of developmental effects for people who drink water containing PFHxS in excess of the MCL following repeated exposure during pregnancy and/or childhood.
PFNA (ng/l)	0.00001	1,000,000	10	10	Discharge from manufacturing	Some people who drink water containing PFNA in

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
PFOA (ng/l)	0.0000040	1,000,000	4.0	0	and industrial chemical facilities, use of certain consumer products, occupational exposures, and certain firefighting activities  Discharge from manufacturing and industrial chemical facilities, use of certain consumer products,	excess of the MCL over many years may have increased health risks such as elevated cholesterol levels, immune effects, and liver effects. In addition, there may be increased risks of developmental effects for people who drink water containing PFNA in excess of the MCL following repeated exposure during pregnancy and/or childhood.  Some people who drink water containing PFOA in excess of the MCL over many years may have increased health risks such as cardiovascular, immune, and liver effects, as well as increased incidence of

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
PFOS (ng/l)	0.0000040	1,000,000	4.0	0	occupational exposures, and certain firefighting activities  Discharge from manufacturing and industrial chemical facilities, use of certain consumer products, occupational exposures, and	certain types of cancers including kidney and testicular cancer. In addition, there may be increased risks of developmental and immune effects for people who drink water containing PFOA in excess of the MCL following repeated exposure during pregnancy and/or childhood.  Some people who drink water containing PFOS in excess of the MCL over many years may have increased health risks such as cardiovascular, immune, and liver effects, as well as increased incidence of certain types of cancers including liver cancer. In

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Picloram (ppb)	.5	1000	500	500	Herbicide runoff	<p>certain firefighting activities</p> <p>addition, there may be increased risks of developmental and immune effects for people who drink water containing PFOS in excess of the MCL following repeated exposure during pregnancy and/or childhood.</p> <p>Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.</p>
Simazine (ppb)	.004	1000	4	4	Herbicide runoff	<p>Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.</p>
Toxaphene (ppb)	.003	1000	3	0	Runoff/	Some people who drink

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Volatile organic contaminants:					leaching from insecticide used on cotton and cattle	water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.
Benzene (ppb)	.005	1000	5	0	Discharge from factories; Leaching from gas storage tanks and landfills	Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets and may have an increased risk of getting cancer.
Carbon tetrachloride (ppb)	.005	1000	5	0	Discharge from chemical plants and other industrial	Some people who drink water containing carbon tetrachloride in excess of the MCL over many years

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Chlorobenzene (ppb)	.1	1000	100	100	activities Discharge from chemical and agricultural chemical factories	could experience problems with their liver and may have an increased risk of getting cancer. Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys
o-Dichlorobenzene (ppb)	.6	1000	600	600	Discharge from industrial chemical factories	Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.
p-Dichlorobenzene (ppb)	.075	1000	75	75	Discharge from industrial chemical factories	Some people who drink water containing p-dichlorobenzene in excess of the MCL over many

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pCi/l = picocuries per liter (a measure of radioactivity)

ppm = parts per million, or milligrams per liter (mg/l)

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
1,2-Dichloroethane (ppb)	.005	1000	5	0	Discharge from industrial chemical factories	years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood. Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
1,1-Dichloroethylene (ppb)	.007	1000	7	7	Discharge from industrial chemical factories	Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
cis-1,2-Dichloroethylene (ppb)	.07	1000	70	70	Discharge from industrial chemical factories	Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
trans-1,2-Dichloroethylene (ppb)	.1	1000	100	100	Discharge from industrial chemical factories	many years could experience problems with their liver. Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.
Dichloromethane (ppb)	.005	1000	5	0	Discharge from pharmaceutical and chemical factories	Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have increased risk of getting cancer.
1,2-Dichloropropane (ppb)	.005	1000	5	0	Discharge from industrial chemical factories	Some people who drink water containing 1,2-dichloropropane in excess of the MCL over

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Ethylbenzene (ppb)	.7	1000	700	700	Discharge from petroleum refineries	many years may have an increased risk of getting cancer. Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
Haloacetic Acids (HAA) (ppb)	.060	1000	60	N/A	By-product of drinking water disinfection	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
Styrene (ppb)	.1	1000	100	100	Discharge from rubber and plastic factories; Leaching from	Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Tetrachloroethylene (ppb)	.005	1000	5	0	landfills Discharge from factories and dry cleaners	liver, kidneys, or circulatory system. Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.
1,2,4-Trichlorobenzene (ppb)	.07	1000	70	70	Discharge from textile-finishing factories	Some people who drink water containing 1,2,4-trichlorobenzene in excess of the MCL over many years could experience changes in the adrenal glands.
1,1,1-Trichloroethane (ppb)	.2	1000	200	200	Discharge from metal degreasing sites and other factories	Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could

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1,1,2-Trichloroethane (ppb)	.005	1000	5	3	Discharge from industrial chemical factories	experience problems with their liver, nervous system, or circulatory system. Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.
Trichloroethylene (ppb)	.005	1000	5	0	Discharge from metal degreasing sites and other factories	Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
TTHMs [Total trihalomethanes] (ppb)	0.10/.080	1000	100/80	N/A	By-product of drinking water disinfection	Some people who drink water containing trihalomethanes in excess

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Toluene (ppm)	1		1	1	Discharge from petroleum factories	of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer. Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys or liver.
Vinyl Chloride (ppb)	.002	1000	2	0	Leaching from PVC piping; Discharge from plastics factories	Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
Xylenes (ppm)	10		10	10	Discharge from petroleum	Some people who drink water containing xylenes

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Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
					factories; Discharge from chemical factories	excess of the MCL over many years could experience damage to the nervous system.

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[65 FR 26024, May 4, 2000, as amended at 65 FR 76749, Dec. 7, 2000; 66 FR 7064, Jan. 22, 2001; 67 FR 70855, Nov. 27, 2002; 67 FR 73011, Dec. 9, 2002; 68 FR 14506, Mar. 25, 2003; 71 FR 65652, Nov. 8, 2006; 78 FR 10349, Feb. 13, 2013; 86 FR 4309, Jan. 15, 2021; 89 FR 32746, Apr. 26, 2024; 89 FR 86663, Oct. 30, 2024]

Subpart P—Enhanced Filtration and Disinfection—Systems Serving 10,000 or More People

Source: 63 FR 69516, Dec. 16, 1998, unless otherwise noted.

§ 141.170 General requirements.

- (a) The requirements of this subpart P constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The requirements of this subpart are applicable to subpart H systems serving at least 10,000 people, beginning January 1, 2002 unless otherwise specified in this subpart. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: *Giardia*

*lamblia*, viruses, heterotrophic plate count bacteria, *Legionella*, *Cryptosporidium*, and turbidity. Each subpart H system serving at least 10,000 people must provide treatment of its source water that complies with these treatment technique requirements and are in addition to those identified in § 141.70. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

- (1) At least 99 percent (2-log) removal of *Cryptosporidium* between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or *Cryptosporidium* control under the watershed control plan for unfiltered systems.
  - (2) Compliance with the profiling and benchmark requirements under the provisions of § 141.172.
- (b) A public water system subject to the requirements of this subpart is considered to be in compliance with the requirements of paragraph (a) of this section if:
- (1) It meets the requirements for avoiding filtration in §§ 141.71 and 141.171 and the disinfection requirements in §§ 141.72 and 141.172; or
  - (2) It meets the applicable filtration requirements in either § 141.73 or § 141.173 and the disinfection requirements in §§ 141.72 and 141.172.
- (c) Systems are not permitted to begin construction of uncovered finished water storage facilities beginning February 16, 1999.
- (d) Subpart H systems that did not conduct optional monitoring under § 141.172 because they served fewer than 10,000 persons when such monitoring was required, but serve more than 10,000 persons prior to January 1, 2005 must comply with §§ 141.170, 141.171, 141.173, 141.174, and 141.175. These systems must also consult with the State to establish a disinfection benchmark. A system that decides to make a significant change to its disinfection practice, as described in § 141.172(c)(1)(i) through (iv) must consult with the State prior to making such change.

[63 FR 69516, Dec. 16, 1998, as amended at 66 FR 3779, Jan. 16, 2001; 67 FR 1836, Jan. 14, 2002; 69 FR 38856, June 29, 2004]

### § 141.171 Criteria for avoiding filtration.

In addition to the requirements of § 141.71, a public water system subject to the requirements of this subpart that does not provide filtration must meet all of the conditions of paragraphs (a) and (b) of this section.

- (a) **Site-specific conditions.** In addition to site-specific conditions in § 141.71(b), systems must maintain the watershed control program under § 141.71(b)(2) to minimize the potential for contamination by *Cryptosporidium* oocysts in the source water. The watershed control program must, for *Cryptosporidium*:
- (1) Identify watershed characteristics and activities which may have an adverse effect on source water quality; and
  - (2) Monitor the occurrence of activities which may have an adverse effect on source water quality.
- (b) During the onsite inspection conducted under the provisions of § 141.71(b)(3), the State must determine whether the watershed control program established under § 141.71(b)(2) is adequate to limit potential contamination by *Cryptosporidium* oocysts. The adequacy of the program must be based on the

comprehensiveness of the watershed review; the effectiveness of the system's program to monitor and control detrimental activities occurring in the watershed; and the extent to which the water system has maximized land ownership and/or controlled land use within the watershed.

### § 141.172 Disinfection profiling and benchmarking.

- (a) *Determination of systems required to profile.* A public water system subject to the requirements of this subpart must determine its TTHM annual average using the procedure in paragraph (a)(1) of this section and its HAA5 annual average using the procedure in paragraph (a)(2) of this section. The annual average is the arithmetic average of the quarterly averages of four consecutive quarters of monitoring.
- (1) The TTHM annual average must be the annual average during the same period as is used for the HAA5 annual average.
- (i) Those systems that collected data under the provisions of subpart M (Information Collection Rule) must use the results of the samples collected during the last four quarters of required monitoring under § 141.142.
- (ii) Those systems that use “grandfathered” HAA5 occurrence data that meet the provisions of paragraph (a)(2)(ii) of this section must use TTHM data collected at the same time under the provisions of §§ 141.12 and 141.30.
- (iii) Those systems that use HAA5 occurrence data that meet the provisions of paragraph (a)(2)(iii)(A) of this section must use TTHM data collected at the same time under the provisions of §§ 141.12 and 141.30.
- (2) The HAA5 annual average must be the annual average during the same period as is used for the TTHM annual average.
- (i) Those systems that collected data under the provisions of subpart M (Information Collection Rule) must use the results of the samples collected during the last four quarters of required monitoring under § 141.142.
- (ii) Those systems that have collected four quarters of HAA5 occurrence data that meets the routine monitoring sample number and location requirements for TTHM in §§ 141.12 and 141.30 and handling and analytical method requirements of § 141.142(b)(1) may use those data to determine whether the requirements of this section apply.
- (iii) Those systems that have not collected four quarters of HAA5 occurrence data that meets the provisions of either paragraph (a)(2)(i) or (ii) of this section by March 16, 1999 must either:
- (A) Conduct monitoring for HAA5 that meets the routine monitoring sample number and location requirements for TTHM in §§ 141.12 and 141.30 and handling and analytical method requirements of § 141.142(b)(1) to determine the HAA5 annual average and whether the requirements of paragraph (b) of this section apply. This monitoring must be completed so that the applicability determination can be made no later than March 31, 2000, or
- (B) Comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with paragraph (b) of this section.
- (3) The system may request that the State approve a more representative annual data set than the data set determined under paragraph (a)(1) or (2) of this section for the purpose of determining applicability of the requirements of this section.



- (4) The State may require that a system use a more representative annual data set than the data set determined under paragraph (a)(1) or (2) of this section for the purpose of determining applicability of the requirements of this section.
- (5) The system must submit data to the State on the schedule in paragraphs (a)(5)(i) through (v) of this section.
  - (i) Those systems that collected TTHM and HAA5 data under the provisions of subpart M (Information Collection Rule), as required by paragraphs (a)(1)(i) and (a)(2)(i) of this section, must submit the results of the samples collected during the last 12 months of required monitoring under § 141.142 not later than December 31, 1999.
  - (ii) Those systems that have collected four consecutive quarters of HAA5 occurrence data that meets the routine monitoring sample number and location for TTHM in §§ 141.12 and 141.30 and handling and analytical method requirements of § 141.142(b)(1), as allowed by paragraphs (a)(1)(ii) and (a)(2)(ii) of this section, must submit those data to the State not later than April 16, 1999. Until the State has approved the data, the system must conduct monitoring for HAA5 using the monitoring requirements specified under paragraph (a)(2)(iii) of this section.
  - (iii) Those systems that conduct monitoring for HAA5 using the monitoring requirements specified by paragraphs (a)(1)(iii) and (a)(2)(iii)(A) of this section, must submit TTHM and HAA5 data not later than March 31, 2000.
  - (iv) Those systems that elect to comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with this section, as allowed under paragraphs (a)(2)(iii)(B) of this section, must notify the State in writing of their election not later than December 31, 1999.
  - (v) If the system elects to request that the State approve a more representative annual data set than the data set determined under paragraph (a)(2)(i) of this section, the system must submit this request in writing not later than December 31, 1999.
- (6) Any system having either a TTHM annual average  $\geq 0.064$  mg/L or an HAA5 annual average  $\geq 0.048$  mg/L during the period identified in paragraphs (a)(1) and (2) of this section must comply with paragraph (b) of this section.

**(b) Disinfection profiling.**

- (1) Any system that meets the criteria in paragraph (a)(6) of this section must develop a disinfection profile of its disinfection practice for a period of up to three years.
- (2) The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT<sub>99.9</sub> values in Tables 1.1-1.6, 2.1, and 3.1 of § 141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section. A system with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in § 141.74(a), as follows:
  - (i) The temperature of the disinfected water must be measured once per day at each residual disinfectant concentration sampling point during peak hourly flow.

- (ii) If the system uses chlorine, the pH of the disinfected water must be measured once per day at each chlorine residual disinfectant concentration sampling point during peak hourly flow.
  - (iii) The disinfectant contact time(s) ("T") must be determined for each day during peak hourly flow.
  - (iv) The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection must be measured each day during peak hourly flow.
- (3) In lieu of the monitoring conducted under the provisions of paragraph (b)(2) of this section to develop the disinfection profile, the system may elect to meet the requirements of paragraph (b)(3)(i) of this section. In addition to the monitoring conducted under the provisions of paragraph (b)(2) of this section to develop the disinfection profile, the system may elect to meet the requirements of paragraph (b)(3)(ii) of this section.
  - (i) A PWS that has three years of existing operational data may submit those data, a profile generated using those data, and a request that the State approve use of those data in lieu of monitoring under the provisions of paragraph (b)(2) of this section not later than March 31, 2000. The State must determine whether these operational data are substantially equivalent to data collected under the provisions of paragraph (b)(2) of this section. These data must also be representative of *Giardia lamblia* inactivation through the entire treatment plant and not just of certain treatment segments. Until the State approves this request, the system is required to conduct monitoring under the provisions of paragraph (b)(2) of this section.
  - (ii) In addition to the disinfection profile generated under paragraph (b)(2) of this section, a PWS that has existing operational data may use those data to develop a disinfection profile for additional years. Such systems may use these additional yearly disinfection profiles to develop a benchmark under the provisions of paragraph (c) of this section. The State must determine whether these operational data are substantially equivalent to data collected under the provisions of paragraph (b)(2) of this section. These data must also be representative of inactivation through the entire treatment plant and not just of certain treatment segments.
- (4) The system must calculate the total inactivation ratio as follows:
  - (i) If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio for the disinfection segment based on either of the methods in paragraph (b)(4)(i)(A) or (b)(4)(i)(B) of this section.
    - (A) Determine one inactivation ratio ( $CT_{calc}/CT_{99.9}$ ) before or at the first customer during peak hourly flow.
    - (B) Determine successive  $CT_{calc}/CT_{99.9}$  values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining ( $CT_{calc}/CT_{99.9}$ ) for each sequence and then adding the ( $CT_{calc}/CT_{99.9}$ ) values together to determine ( $\Sigma CT_{calc}/CT_{99.9}$ ).
  - (ii) If the system uses more than one point of disinfectant application before the first customer, the system must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The ( $CT_{calc}/CT_{99.9}$ ) value of each segment and ( $\Sigma CT_{calc}/CT_{99.9}$ ) must be calculated using the method in paragraph (b)(4)(i) of this section.

- (iii) The system must determine the total logs of inactivation by multiplying the value calculated in paragraph (b)(4)(i) or (ii) of this section by 3.0.
- (5) A system that uses either chloramines or ozone for primary disinfection must also calculate the logs of inactivation for viruses using a method approved by the State.
- (6) The system must retain disinfection profile data in graphic form, as a spreadsheet, or in some other format acceptable to the State for review as part of sanitary surveys conducted by the State.

(c) **Disinfection benchmarking.**

- (1) Any system required to develop a disinfection profile under the provisions of paragraphs (a) and (b) of this section and that decides to make a significant change to its disinfection practice must consult with the State prior to making such change. Significant changes to disinfection practice are:
  - (i) Changes to the point of disinfection;
  - (ii) Changes to the disinfectant(s) used in the treatment plant;
  - (iii) Changes to the disinfection process; and
  - (iv) Any other modification identified by the State.
- (2) Any system that is modifying its disinfection practice must calculate its disinfection benchmark using the procedure specified in paragraphs (c)(2)(i) through (ii) of this section.
  - (i) For each year of profiling data collected and calculated under paragraph (b) of this section, the system must determine the lowest average monthly *Giardia lamblia* inactivation in each year of profiling data. The system must determine the average *Giardia lamblia* inactivation for each calendar month for each year of profiling data by dividing the sum of daily *Giardia lamblia* of inactivation by the number of values calculated for that month.
  - (ii) The disinfection benchmark is the lowest monthly average value (for systems with one year of profiling data) or average of lowest monthly average values (for systems with more than one year of profiling data) of the monthly logs of *Giardia lamblia* inactivation in each year of profiling data.
- (3) A system that uses either chloramines or ozone for primary disinfection must also calculate the disinfection benchmark for viruses using a method approved by the State.
- (4) The system must submit information in paragraphs (c)(4)(i) through (iii) of this section to the State as part of its consultation process.
  - (i) A description of the proposed change;
  - (ii) The disinfection profile for *Giardia lamblia* (and, if necessary, viruses) under paragraph (b) of this section and benchmark as required by paragraph (c)(2) of this section; and
  - (iii) An analysis of how the proposed change will affect the current levels of disinfection.

[63 FR 69516, Dec. 16, 1998, as amended at 66 FR 3779, Jan. 16, 2001]

## § 141.173 Filtration.

A public water system subject to the requirements of this subpart that does not meet all of the criteria in this subpart and subpart H of this part for avoiding filtration must provide treatment consisting of both disinfection, as specified in § 141.72(b), and filtration treatment which complies with the requirements of paragraph (a) or (b) of this section or § 141.73 (b) or (c) by December 31, 2001.

(a) **Conventional filtration treatment or direct filtration.**

- (1) For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month, measured as specified in § 141.74(a) and (c).
- (2) The turbidity level of representative samples of a system's filtered water must at no time exceed 1 NTU, measured as specified in § 141.74(a) and (c).
- (3) A system that uses lime softening may acidify representative samples prior to analysis using a protocol approved by the State.

(b) **Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration.** A public water system may use a filtration technology not listed in paragraph (a) of this section or in § 141.73(b) or

- (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of § 141.72(b), consistently achieves 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of *Cryptosporidium* oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of *Cryptosporidium* oocysts.

[63 FR 69516, Dec. 16, 1998, as amended at 65 FR 20313, Apr. 14, 2000; 66 FR 3779, Jan. 16, 2001]

## § 141.174 Filtration sampling requirements.

- (a) Monitoring requirements for systems using filtration treatment. In addition to monitoring required by § 141.74, a public water system subject to the requirements of this subpart that provides conventional filtration treatment or direct filtration must conduct continuous monitoring of turbidity for each individual filter using an approved method in § 141.74(a) and must calibrate turbidimeters using the procedure specified by the manufacturer. Systems must record the results of individual filter monitoring every 15 minutes.
- (b) If there is a failure in the continuous turbidity monitoring equipment, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

### § 141.175 Reporting and recordkeeping requirements.

In addition to the reporting and recordkeeping requirements in § 141.75, a public water system subject to the requirements of this subpart that provides conventional filtration treatment or direct filtration must report monthly to the State the information specified in paragraphs (a) and (b) of this section beginning January 1, 2002. In addition to the reporting and recordkeeping requirements in § 141.75, a public water system subject to the requirements of this subpart that provides filtration approved under § 141.173(b) must report monthly to the State the information specified in paragraph (a) of this section beginning January 1, 2002. The reporting in paragraph (a) of this section is in lieu of the reporting specified in § 141.75(b)(1).

- (a) Turbidity measurements as required by § 141.173 must be reported within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:
  - (1) The total number of filtered water turbidity measurements taken during the month.
  - (2) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in § 141.173(a) or (b).
  - (3) The date and value of any turbidity measurements taken during the month which exceed 1 NTU for systems using conventional filtration treatment or direct filtration, or which exceed the maximum level set by the State under § 141.173(b).
- (b) Systems must maintain the results of individual filter monitoring taken under § 141.174 for at least three years. Systems must report that they have conducted individual filter turbidity monitoring under § 141.174 within 10 days after the end of each month the system serves water to the public. Systems must report individual filter turbidity measurement results taken under § 141.174 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in paragraphs (b)(1) through (4) of this section. Systems that use lime softening may apply to the State for alternative exceedance levels for the levels specified in paragraphs (b)(1) through (4) of this section if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.
  - (1) For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.
  - (2) For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.
  - (3) For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the

exceedance and report that the self-assessment was conducted. The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.

- (4) For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation by the State or a third party approved by the State no later than 30 days following the exceedance and have the evaluation completed and submitted to the State no later than 90 days following the exceedance.

(c) **Additional reporting requirements.**

- (1) If at any time the turbidity exceeds 1 NTU in representative samples of filtered water in a system using conventional filtration treatment or direct filtration, the system must inform the State as soon as possible, but no later than the end of the next business day.
- (2) If at any time the turbidity in representative samples of filtered water exceeds the maximum level set by the State under § 141.173(b) for filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, the system must inform the State as soon as possible, but no later than the end of the next business day.

[63 FR 69516, Dec. 16, 1998, as amended at 66 FR 3779, Jan. 16, 2001]

## Subpart Q—Public Notification of Drinking Water Violations

**Source:** 65 FR 26035, May 4, 2000, unless otherwise noted.

### § 141.201 General public notification requirements.

Public water systems in States with primacy for the public water system supervision (PWSS) program must comply with the requirements in this subpart no later than May 6, 2002 or on the date the State-adopted rule becomes effective, whichever comes first. Public water systems in jurisdictions where EPA directly implements the PWSS program must comply with the requirements in this subpart on October 31, 2000. Prior to these dates, public water systems must continue to comply with the public notice requirements in § 141.32 of this part. The term “primacy agency” is used in this subpart to refer to either EPA or the State or the Tribe in cases where EPA, the State, or the Tribe exercises primary enforcement responsibility for this subpart.

- (a) **Who must give public notice?** Each owner or operator of a public water system (community water systems, non-transient non-community water systems, and transient non-community water systems) must give notice for all violations of national primary drinking water regulations (NPDWR) and for other situations, as listed in Table 1. The term “NPDWR violations” is used in this subpart to include violations of the

maximum contaminant level (MCL), maximum residual disinfection level (MRDL), treatment technique (TT), monitoring requirements, and testing procedures in this part 141. Appendix A to this subpart identifies the tier assignment for each specific violation or situation requiring a public notice.

### TABLE 1 TO § 141.201—VIOLATION CATEGORIES AND OTHER SITUATIONS REQUIRING A PUBLIC NOTICE

- (1) NPDWR violations:
    - (i) Failure to comply with an applicable maximum contaminant level (MCL) or maximum residual disinfectant level (MRDL).
    - (ii) Failure to comply with a prescribed treatment technique (TT).
    - (iii) Failure to perform water quality monitoring, as required by the drinking water regulations.
    - (iv) Failure to comply with testing procedures as prescribed by a drinking water regulation.
  - (2) Variance and exemptions under sections 1415 and 1416 of SDWA:
    - (i) Operation under a variance or an exemption.
    - (ii) Failure to comply with the requirements of any schedule that has been set under a variance or exemption.
  - (3) Special public notices:
    - (i) Occurrence of a waterborne disease outbreak or other waterborne emergency.
    - (ii) Exceedance of the nitrate MCL by non-community water systems (NCWS), where granted permission by the primacy agency under 141.11(d) of this part.
    - (iii) Exceedance of the secondary maximum contaminant level (SMCL) for fluoride.
    - (iv) Availability of unregulated contaminant monitoring data.
    - (v) Other violations and situations determined by the primacy agency to require a public notice under this subpart, not already listed in Appendix A.
    - (vi) Exceedance of the lead action level.
- 

- (b) ***What type of public notice is required for each violation or situation?*** Public notice requirements are divided into three tiers, to take into account the seriousness of the violation or situation and of any potential adverse health effects that may be involved. The public notice requirements for each violation or situation listed in Table 1 of this section are determined by the tier to which it is assigned. Table 2 of this section provides the definition of each tier. Appendix A of this part identifies the tier assignment for each specific violation or situation.

### TABLE 2 TO § 141.201—DEFINITION OF PUBLIC NOTICE TIERS

- (1) *Tier 1 public notice*—required for NPDWR violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure.

- (2) *Tier 2 public notice*—required for all other NPDWR violations and situations with potential to have serious adverse effects on human health.
- (3) *Tier 3 public notice*—required for all other NPDWR violations and situations not included in Tier 1 and Tier 2.
- 

(c) **Who must be notified?**

- (1) Each public water system must provide public notice to persons served by the water system, in accordance with this subpart. Public water systems that sell or otherwise provide drinking water to other public water systems (*i.e.*, to consecutive systems) are required to give public notice to the owner or operator of the consecutive system; the consecutive system is responsible for providing public notice to the persons it serves.
- (2) If a public water system has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, the primacy agency may allow the system to limit distribution of the public notice to only persons served by that portion of the system which is out of compliance. Permission by the primacy agency for limiting distribution of the notice must be granted in writing.
- (3) A copy of the notice must also be sent to the primacy agency and the Administrator (as applicable) in accordance with the requirements of § 141.31(d).

[65 FR 26035, May 4, 2000, as amended at 86 FR 4309, Jan. 15, 2021]

**§ 141.202 Tier 1 Public Notice—Form, manner, and frequency of notice.**

- (a) **Which violations or situations require a Tier 1 public notice?** Table 1 of this section lists the violation categories and other situations requiring a Tier 1 public notice. Appendix A to this subpart identifies the tier assignment for each specific violation or situation.

**TABLE 1 TO § 141.202—VIOLATION CATEGORIES AND OTHER SITUATIONS  
REQUIRING A TIER 1 PUBLIC NOTICE**

- (1) Violation of the MCL for total coliforms when fecal coliform or *E. coli* are present in the water distribution system (as specified in § 141.63(b)), or when the water system fails to test for fecal coliforms or *E. coli* when any repeat sample tests positive for coliform (as specified in § 141.21(e)); Violation of the MCL for *E. coli* (as specified in § 141.63(c));
- (2) Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, as defined in § 141.62, or when the water system fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate or nitrite MCL, as specified in § 141.23(f)(2);
- (3) Exceedance of the nitrate MCL by non-community water systems, where permitted to exceed the MCL by the primacy agency under § 141.11(d), as required under § 141.209;



- (4) Violation of the MRDL for chlorine dioxide, as defined in § 141.65(a), when one or more samples taken in the distribution system the day following an exceedance of the MRDL at the entrance of the distribution system exceed the MRDL, or when the water system does not take the required samples in the distribution system, as specified in § 141.133(c)(2)(i);
  - (5) Violation of the turbidity MCL under § 141.13(b), where the primacy agency determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;
  - (6) Violation of the Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR) or Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit (as identified in appendix A), where the primacy agency determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;
  - (7) Occurrence of a waterborne disease outbreak, as defined in § 141.2, or other waterborne emergency (such as a failure or significant interruption in key water treatment processes, a natural disaster that disrupts the water supply or distribution system, or a chemical spill or unexpected loading of possible pathogens into the source water that significantly increases the potential for drinking water contamination);
  - (8) Detection of *E. coli*, enterococci, or coliphage in source water samples as specified in § 141.402(a) and § 141.402(b);
  - (9) Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the primacy agency either in its regulations or on a case-by-case basis.
  - (10) Exceedance of the Action Level for lead as specified in § 141.80(c).
- 

(b) ***When is the Tier 1 public notice to be provided?*** What additional steps are required? Public water systems must:

- (1) Provide a public notice as soon as practical but no later than 24 hours after the system learns of the violation or situation requiring Tier 1 public notice;
- (2) Initiate consultation with the primacy agency as soon as practical, but no later than 24 hours after the public water system learns of the violation or situation, to determine additional public notice requirements; and
- (3) Comply with any additional public notification requirements (including any repeat notices or direction on the duration of the posted notices) that are established as a result of the consultation with the primacy agency. Such requirements may include the timing, form, manner, frequency, and content of repeat notices (if any) and other actions designed to reach all persons served.

(c) ***What is the form and manner of the public notice?*** Public water systems must provide the notice within 24 hours in a form and manner reasonably calculated to reach all persons served. The form and manner used by the public water system are to fit the specific situation, but must be designed to reach residential, transient, and non-transient users of the water system. In order to reach all persons served, water systems are to use, at a minimum, one or more of the following forms of delivery:

- (1) Appropriate broadcast media (such as radio and television);

- (2) Posting of the notice in conspicuous locations throughout the area served by the water system;
- (3) Hand delivery of the notice to persons served by the water system; or
- (4) Another delivery method approved in writing by the primacy agency.

[65 FR 26035, May 4, 2000, as amended at 67 FR 1836, Jan. 14, 2002; 71 FR 65652, Nov. 8, 2006; 78 FR 10350, Feb. 13, 2013; 86 FR 4309, Jan. 15, 2021; 89 FR 86663, Oct. 30, 2024]

## § 141.203 Tier 2 Public Notice—Form, manner, and frequency of notice.

- (a) *Which violations or situations require a Tier 2 public notice?* Table 1 of this section lists the violation categories and other situations requiring a Tier 2 public notice. Appendix A to this subpart identifies the tier assignment for each specific violation or situation.

### TABLE 1 TO § 141.203—VIOLATION CATEGORIES AND OTHER SITUATIONS REQUIRING A TIER 2 PUBLIC NOTICE

- (1) All violations of the MCL, MRDL, and treatment technique requirements, except where a Tier 1 notice is required under § 141.202(a) or where the primacy agency determines that a Tier 1 notice is required;
  - (2) Violations of the monitoring and testing procedure requirements, where the primacy agency determines that a Tier 2 rather than a Tier 3 public notice is required, taking into account potential health impacts and persistence of the violation; and
  - (3) Failure to comply with the terms and conditions of any variance or exemption in place.
  - (4) Failure to take corrective action or failure to maintain at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer under § 141.403(a).
- 

- (b) *When is the Tier 2 public notice to be provided?*

- (1) Public water systems must provide the public notice as soon as practical, but no later than 30 days after the system learns of the violation. If the public notice is posted, the notice must remain in place for as long as the violation or situation persists, but in no case for less than seven days, even if the violation or situation is resolved. The primacy agency may, in appropriate circumstances, allow additional time for the initial notice of up to three months from the date the system learns of the violation. It is not appropriate for the primacy agency to grant an extension to the 30-day deadline for any unresolved violation or to allow across-the-board extensions by rule or policy for other violations or situations requiring a Tier 2 public notice. Extensions granted by the primacy agency must be in writing.
- (2) The public water system must repeat the notice every three months as long as the violation or situation persists, unless the primacy agency determines that appropriate circumstances warrant a different repeat notice frequency. In no circumstance may the repeat notice be given less frequently than once per year. It is not appropriate for the primacy agency to allow less frequent repeat notice for an MCL or treatment technique violation under the Total Coliform Rule or subpart Y of this part or

a treatment technique violation under the Surface Water Treatment Rule or Interim Enhanced Surface Water Treatment Rule. It is also not appropriate for the primacy agency to allow through its rules or policies across-the-board reductions in the repeat notice frequency for other ongoing violations requiring a Tier 2 repeat notice. Primacy agency determinations allowing repeat notices to be given less frequently than once every three months must be in writing.

- (3) For the turbidity violations specified in this paragraph, public water systems must consult with the primacy agency as soon as practical but no later than 24 hours after the public water system learns of the violation, to determine whether a Tier 1 public notice under § 141.202(a) is required to protect public health. When consultation does not take place within the 24-hour period, the water system must distribute a Tier 1 notice of the violation within the next 24 hours (i.e., no later than 48 hours after the system learns of the violation), following the requirements under § 141.202(b) and (c). Consultation with the primacy agency is required for:

- (i) Violation of the turbidity MCL under § 141.13(b); or
- (ii) Violation of the SWTR, IESWTR or LT1ESWTR treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit.

- (c) ***What is the form and manner of the Tier 2 public notice?*** Public water systems must provide the initial public notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

- (1) Unless directed otherwise by the primacy agency in writing, community water systems must provide notice by:
  - (i) Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and
  - (ii) Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in paragraph (c)(1)(i) of this section. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: Publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places served by the system or on the Internet; or delivery to community organizations.
- (2) Unless directed otherwise by the primacy agency in writing, non-community water systems must provide notice by:
  - (i) Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and
  - (ii) Any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice required in paragraph (c)(2)(i) of this section. Such persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. Other methods may include: Publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (e.g., community centers).

[65 FR 26035, May 4, 2000, as amended at 67 FR 1836, Jan. 14, 2002; 71 FR 65652, Nov. 8, 2006; 78 FR 10350, Feb. 13, 2013]

**§ 141.204 Tier 3 Public Notice—Form, manner, and frequency of notice.**

- (a) *Which violations or situations require a Tier 3 public notice?* Table 1 of this section lists the violation categories and other situations requiring a Tier 3 public notice. Appendix A to this subpart identifies the tier assignment for each specific violation or situation.

**TABLE 1 TO § 141.204—VIOLATION CATEGORIES AND OTHER SITUATIONS  
REQUIRING A TIER 3 PUBLIC NOTICE**

- (1) Monitoring violations under 40 CFR part 141, except where a Tier 1 notice is required under § 141.202(a) or where the primacy agency determines that a Tier 2 notice is required;
  - (2) Failure to comply with a testing procedure established in 40 CFR part 141, except where a Tier 1 notice is required under § 141.202(a) or where the primacy agency determines that a Tier 2 notice is required;
  - (3) Operation under a variance granted under Section 1415 or an exemption granted under Section 1416 of the Safe Drinking Water Act;
  - (4) Availability of unregulated contaminant monitoring results, as required under § 141.207;
  - (5) Exceedance of the fluoride secondary maximum contaminant level (SMCL), as required under § 141.208; and
  - (6) Reporting and Recordkeeping violations under subpart Y of 40 CFR part 141.
- 

- (b) *When is the Tier 3 public notice to be provided?*

- (1) Public water systems must provide the public notice not later than one year after the public water system learns of the violation or situation or begins operating under a variance or exemption. Following the initial notice, the public water system must repeat the notice annually for as long as the violation, variance, exemption, or other situation persists. If the public notice is posted, the notice must remain in place for as long as the violation, variance, exemption, or other situation persists, but in no case less than seven days (even if the violation or situation is resolved).
- (2) Instead of individual Tier 3 public notices, a public water system may use an annual report detailing all violations and situations that occurred during the previous twelve months, as long as the timing requirements of paragraph (b)(1) of this section are met.

- (c) *What is the form and manner of the Tier 3 public notice?* Public water systems must provide the initial notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

- (1) Unless directed otherwise by the primacy agency in writing, community water systems must provide notice by:
  - (i) Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

- (ii) Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in paragraph (c)(1)(i) of this section. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: Publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places or on the Internet; or delivery to community organizations.
- (2) Unless directed otherwise by the primacy agency in writing, non-community water systems must provide notice by:
  - (i) Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and
  - (ii) Any other method reasonably calculated to reach other persons served by the system, if they would not normally be reached by the notice required in paragraph (c)(2)(i) of this section. Such persons may include those who may not see a posted notice because the notice is not in a location they routinely pass by. Other methods may include: Publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (e.g., community centers).
- (d) ***In what situations may the Consumer Confidence Report be used to meet the Tier 3 public notice requirements?*** For community water systems, the Consumer Confidence Report (CCR) required under Subpart O of this part may be used as a vehicle for the initial Tier 3 public notice and all required repeat notices, as long as:
  - (1) The CCR is provided to persons served no later than 12 months after the system learns of the violation or situation as required under § 141.204(b);
  - (2) The Tier 3 notice contained in the CCR follows the content requirements under § 141.205; and
  - (3) The CCR is distributed following the delivery requirements under § 141.204(c).

[65 FR 26035, May 4, 2000; 65 FR 38629, June 21, 2000, as amended at 78 FR 10350, Feb. 13, 2013]

## § 141.205 Content of the public notice.

- (a) ***What elements must be included in the public notice for violations of National Primary Drinking Water Regulations (NPDWR) or other situations requiring a public notice?*** When a public water system violates a NPDWR or has a situation requiring public notification, each public notice must include the following elements:
  - (1) A description of the violation or situation, including the contaminant(s) of concern, and (as applicable) the contaminant level(s);
  - (2) When the violation or situation occurred;
  - (3) Any potential adverse health effects from the violation or situation, including the standard language under paragraph (d)(1) or (d)(2) of this section, whichever is applicable;

- (4) The population at risk, including subpopulations particularly vulnerable if exposed to the contaminant in their drinking water;
- (5) Whether alternative water supplies should be used;
- (6) What actions consumers should take, including when they should seek medical help, if known;
- (7) What the system is doing to correct the violation or situation;
- (8) When the water system expects to return to compliance or resolve the situation;
- (9) The name, business address, and phone number of the water system owner, operator, or designee of the public water system as a source of additional information concerning the notice; and
- (10) A statement to encourage the notice recipient to distribute the public notice to other persons served, using the standard language under paragraph (d)(3) of this section, where applicable.

**(b) *What elements must be included in the public notice for public water systems operating under a variance or exemption?***

- (1) If a public water system has been granted a variance or an exemption, the public notice must contain:
  - (i) An explanation of the reasons for the variance or exemption;
  - (ii) The date on which the variance or exemption was issued;
  - (iii) A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption; and
  - (iv) A notice of any opportunity for public input in the review of the variance or exemption.
- (2) If a public water system violates the conditions of a variance or exemption, the public notice must contain the ten elements listed in paragraph (a) of this section.

**(c) *How is the public notice to be presented?***

- (1) Each public notice required by this section:
  - (i) Must be displayed in a conspicuous way when printed or posted;
  - (ii) Must not contain overly technical language or very small print;
  - (iii) Must not be formatted in a way that defeats the purpose of the notice;
  - (iv) Must not contain language which nullifies the purpose of the notice.
- (2) Each public notice required by this section must comply with multilingual requirements, as follows:
  - (i) For public water systems serving a large proportion of non-English speaking consumers, as determined by the primacy agency, the public notice must contain information in the appropriate language(s) regarding the importance of the notice or contain a telephone number or address where persons served may contact the water system to obtain a translated copy of the notice or to request assistance in the appropriate language.

- (ii) In cases where the primacy agency has not determined what constitutes a large proportion of non-English speaking consumers, the public water system must include in the public notice the same information as in paragraph (c)(2)(i) of this section, where appropriate to reach a large proportion of non-English speaking persons served by the water system.

(d) ***What standard language must public water systems include in their public notice?*** Public water systems are required to include the following standard language in their public notice:

- (1) Standard health effects language for MCL or MRDL violations, treatment technique violations, and violations of the condition of a variance or exemption. Public water systems must include in each public notice the health effects language specified in appendix B to this subpart corresponding to each MCL, MRDL, and treatment technique violation listed in appendix A to this subpart, and for each violation of a condition of a variance or exemption.
- (2) Standard language for monitoring and testing procedure violations. Public water systems must include the following language in their notice, including the language necessary to fill in the blanks, for all monitoring and testing procedure violations listed in appendix A to this subpart:

We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During [compliance period], we “did not monitor or test” or “did not complete all monitoring or testing” for [contaminant(s)], and therefore cannot be sure of the quality of your drinking water during that time.

- (3) Standard language to encourage the distribution of the public notice to all persons served. Public water systems must include in their notice the following language (where applicable):

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

#### **§ 141.206 Notice to new billing units or new customers.**

- (a) ***What is the requirement for community water systems?*** Community water systems must give a copy of the most recent public notice for any continuing violation, the existence of a variance or exemption, or other ongoing situations requiring a public notice to all new billing units or new customers prior to or at the time service begins.
- (b) ***What is the requirement for non-community water systems?*** Non-community water systems must continuously post the public notice in conspicuous locations in order to inform new consumers of any continuing violation, variance or exemption, or other situation requiring a public notice for as long as the violation, variance, exemption, or other situation persists.

#### **§ 141.207 Special notice of the availability of unregulated contaminant monitoring results.**

- (a) ***When is the special notice to be given?*** The owner or operator of a community water system or non-transient, non-community water system required to monitor under § 141.40 must notify persons served by the system of the availability of the results of such sampling no later than 12 months after the monitoring results are known.

- (b) *What is the form and manner of the special notice?* The form and manner of the public notice must follow the requirements for a Tier 3 public notice prescribed in §§ 141.204(c), (d)(1), and (d)(3). The notice must also identify a person and provide the telephone number to contact for information on the monitoring results.

### § 141.208 Special notice for exceedance of the SMCL for fluoride.

- (a) *When is the special notice to be given?* Community water systems that exceed the fluoride secondary maximum contaminant level (SMCL) of 2 mg/l as specified in § 143.3 (determined by the last single sample taken in accordance with § 141.23), but do not exceed the maximum contaminant level (MCL) of 4 mg/l for fluoride (as specified in § 141.62), must provide the public notice in paragraph (c) of this section to persons served. Public notice must be provided as soon as practical but no later than 12 months from the day the water system learns of the exceedance. A copy of the notice must also be sent to all new billing units and new customers at the time service begins and to the State public health officer. The public water system must repeat the notice at least annually for as long as the SMCL is exceeded. If the public notice is posted, the notice must remain in place for as long as the SMCL is exceeded, but in no case less than seven days (even if the exceedance is eliminated). On a case-by-case basis, the primacy agency may require an initial notice sooner than 12 months and repeat notices more frequently than annually.
- (b) *What is the form and manner of the special notice?* The form and manner of the public notice (including repeat notices) must follow the requirements for a Tier 3 public notice in § 141.204(c) and (d)(1) and (d)(3).
- (c) *What mandatory language must be contained in the special notice?* The notice must contain the following language, including the language necessary to fill in the blanks:

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 [insert 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 should be provided with alternative 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 U.S. Environmental Protection Agency'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."



**§ 141.209 Special notice for nitrate exceedances above MCL by non-community water systems (NCWS), where granted permission by the primacy agency under § 141.11(d).**

- (a) *When is the special notice to be given?* The owner or operator of a non-community water system granted permission by the primacy agency under § 141.11(d) to exceed the nitrate MCL must provide notice to persons served according to the requirements for a Tier 1 notice under § 141.202(a) and (b).
- (b) *What is the form and manner of the special notice?* Non-community water systems granted permission by the primacy agency to exceed the nitrate MCL under § 141.11(d) must provide continuous posting of the fact that nitrate levels exceed 10 mg/l and the potential health effects of exposure, according to the requirements for Tier 1 notice delivery under § 141.202(c) and the content requirements under § 141.205.

**§ 141.210 Notice by primacy agency on behalf of the public water system.**

- (a) *May the primacy agency give the notice on behalf of the public water system?* The primacy agency may give the notice required by this subpart on behalf of the owner and operator of the public water system if the primacy agency complies with the requirements of this subpart.
- (b) *What is the responsibility of the public water system when notice is given by the primacy agency?* The owner or operator of the public water system remains responsible for ensuring that the requirements of this subpart are met.

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

- (a) *When is the special notice for repeated failure to monitor to be given?* The owner or operator of a community or non-community water system that is required to monitor source water under § 141.701 must notify persons served by the water system that monitoring has not been completed as specified no later than 30 days after the system has failed to collect any 3 months of monitoring as specified in § 141.701(c). The notice must be repeated as specified in § 141.203(b).
- (b) *When is the special notice for failure to determine bin classification or mean *Cryptosporidium* level to be given?* The owner or operator of a community or non-community water system that is required to determine a bin classification under § 141.710, or to determine mean *Cryptosporidium* level under § 141.712, must notify persons served by the water system that the determination has not been made as required no later than 30 days after the system has failed report the determination as specified in § 141.710(e) or § 141.712(a), respectively. The notice must be repeated as specified in § 141.203(b). The notice is not required if the system is complying with a State-approved schedule to address the violation.
- (c) *What is the form and manner of the special notice?* The form and manner of the public notice must follow the requirements for a Tier 2 public notice prescribed in § 141.203(c). The public notice must be presented as required in § 141.205(c).
- (d) *What mandatory language must be contained in the special notice?* The notice must contain the following language, including the language necessary to fill in the blanks.

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

We are required to monitor the source of your drinking water for *Cryptosporidium*. Results of the monitoring are to be used to determine whether water treatment at the (treatment plant name) is sufficient to adequately remove *Cryptosporidium* from your drinking water. We are required to complete this monitoring and make this determination by (required bin determination date). We “did not monitor or test” or “did not complete all monitoring or testing” on schedule and, therefore, we may not be able to

determine by the required date what treatment modifications, if any, must be made to ensure adequate *Cryptosporidium* removal. Missing this deadline may, in turn, jeopardize our ability to have the required treatment modifications, if any, completed by the deadline required, (date).

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

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

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

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

[71 FR 768, Jan. 5, 2006]

## Appendix A to Subpart Q of Part 141—NPDWR Violations and Other Situations Requiring Public Notice<sup>1</sup>

Contaminant	MCL/MRDL/TT violations <sup>2</sup>		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
I. Violations of National Primary Drinking Water Regulations (NPDWR): <sup>3</sup>				
A. Microbiological Contaminants				
1.a Total coliform bacteria †	2	141.63(a)	3	141.21(a)-(e).
1.b Total coliform (TT violations resulting from failure to perform assessments or corrective actions, monitoring violations, and reporting violations) ‡	2	141.860(b)(1)	3	141.860(c)(1).
1.c Seasonal system failure to follow State-approved start-up plan prior to serving water to the public or failure to provide certification to State ‡	2	141.860(b)(2)	3	141.860(d)(1). 141.860(d)(3).

Contaminant	MCL/MRDL/TT violations <sup>2</sup>		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
2.a Fecal coliform/ <i>E. coli</i> †	1	141.63(b)	<sup>4</sup> 1,3	141.21(e)
2.b <i>E. coli</i> (MCL, monitoring, and reporting violations) ‡	1	141.860 (a)	3	141.860(c)(2)  141.860(d)(1). 141.860(d)(2).
2.c <i>E. coli</i> (TT violations resulting from failure to perform level 2 Assessments or corrective action) ‡	2	141.860(b)(1)		
3. Turbidity MCL	2	141.13(a)	3	141.22
4. Turbidity MCL (average of 2 days' samples >5 NTU)	<sup>5</sup> 2, 1	141.13(b)	3	141.22
5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level)	<sup>6</sup> 2, 1	141.71(a)(2), 141.71(c)(2)(i), 141.73(a)(2), 141.73 (b)(2), 141.73 (c)(2), 141.73(d), 141.173(a)(2), 141.173(b), 141.551(b)	3	141.74(a)(1), 141.74(b)(2), 141.74(c)(1), 141.174, 141.560(a)-(c), 141.561.
6. Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT)	2	141.70-141.73	3	141.74
7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. turbidity level (TT)	<sup>7</sup> 2	141.170-141.173, 141.500-141.553	3	141.172, 141.174, 141.530-141.544, 141.560-141.564.
8. Filter Backwash Recycling Rule violations	2	141.76(c)	3	141.76(b), (d)
9. Long Term 1 Enhanced Surface Water Treatment Rule violations	2	141.500-141.553	3	141.530-141.544, 141.560-141.564.
10. LT2ESWTR violations	2	141.710-141.720	<sup>22</sup> 2, 3	141.701-141.705 and 141.708-141.709.
11. Ground Water Rule violations	2	141.404	3	141.402(h), 141.403(d).
B. Inorganic Chemicals (IOCs)				

Contaminant	MCL/MRDL/TT violations <sup>2</sup>		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
1. Antimony	2	141.62(b)	3	141.23(a), (c)
2. Arsenic	2	<sup>8</sup> 141.62(b)	3	<sup>11</sup> 141.23(a), (c)
3. Asbestos (fibers >10 µm)	2	141.62(b)	3	141.23(a)-(b)
4. Barium	2	141.62(b)	3	141.23(a), (c)
5. Beryllium	2	141.62(b)	3	141.23(a), (c)
6. Cadmium	2	141.62(b)	3	141.23(a), (c)
7. Chromium (total)	2	141.62(b)	3	141.23(a), (c)
8. Cyanide	2	141.62(b)	3	141.23(a), (c)
9. Fluoride	2	141.62(b)	3	141.23(a), (c)
10. Mercury (inorganic)	2	141.62(b)	3	141.23(a), (c)
11. Nitrate	1	141.62(b)	<sup>12</sup> 1, 3	141.23(a), (d), 141.23(f)(2)
12. Nitrite	1	141.62(b)	<sup>12</sup> 1, 3	141.23(a), (e), 141.23(f)(2)
13. Total Nitrate and Nitrite	1	141.62(b)	3	141.23(a)
14. Selenium	2	141.62(b)	3	141.23(a), (c)
15. Thallium	2	141.62(b)	3	141.23(a), (c)
C. Lead and Copper Rule (Action Level for lead is 0.015 mg/L, for copper is 1.3 mg/L)				
1. Lead and Copper Rule (TT)	2	141.80 (except paragraph (c)) through 141.84, 141.85(a) through (c) (except paragraphs (c)(3)), (h), and (j), and 141.93	3	141.86 through 141.90, 141.92.
2. Exceedance of the Action Level for lead	1	141.80(c)		
D. Synthetic Organic Chemicals (SOCs)				
1. 2,4-D	2	141.61(c)	3	141.24(h)
2. 2,4,5-TP (Silvex)	2	141.61(c)	3	141.24(h)
3. Alachlor	2	141.61(c)	3	141.24(h)
4. Atrazine	2	141.61(c)	3	141.24(h)

Contaminant	MCL/MRDL/TT violations <sup>2</sup>		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
5. Benzo(a)pyrene (PAHs)	2	141.61(c)	3	141.24(h)
6. Carbofuran	2	141.61(c)	3	141.24(h)
7. Chlordane	2	141.61(c)	3	141.24(h)
8. Dalapon	2	141.61(c)	3	141.24(h)
9. Di (2-ethylhexyl) adipate	2	141.61(c)	3	141.24(h)
10. Di (2-ethylhexyl) phthalate	2	141.61(c)	3	141.24(h)
11. Dibromochloropropane	2	141.61(c)	3	141.24(h)
12. Dinoseb	2	141.61(c)	3	141.24(h)
13. Dioxin (2,3,7,8-TCDD)	2	141.61(c)	3	141.24(h)
14. Diquat	2	141.61(c)	3	141.24(h)
15. Endothall	2	141.61(c)	3	141.24(h)
16. Endrin	2	141.61(c)	3	141.24(h)
17. Ethylene dibromide	2	141.61(c)	3	141.24(h)
18. Glyphosate	2	141.61(c)	3	141.24(h)
19. Heptachlor	2	141.61(c)	3	141.24(h)
20. Heptachlor epoxide	2	141.61(c)	3	141.24(h)
21. Hexachlorobenzene	2	141.61(c)	3	141.24(h)
22. Hexachlorocyclo-pentadiene	2	141.61(c)	3	141.24(h)
23. Lindane	2	141.61(c)	3	141.24(h)
24. Methoxychlor	2	141.61(c)	3	141.24(h)
25. Oxamyl (Vydate)	2	141.61(c)	3	141.24(h)
26. Pentachlorophenol	2	141.61(c)	3	141.24(h)
27. Picloram	2	141.61(c)	3	141.24(h)
28. Polychlorinated biphenyls (PCBs)	2	141.61(c)	3	141.24(h)
29. Simazine	2	141.61(c)	3	141.24(h)
30. Toxaphene	2	141.61(c)	3	141.24(h)
31. Hazard Index PFAS	<sup>23</sup> * 2	141.61(c)	3	141.905(c)
32. HFPO-DA	* 2	141.61(c)	3	141.905(c)
33. PFHxS	* 2	141.61(c)	3	141.905(c)
34. PFNA	* 2	141.61(c)	3	141.905(c)
35. PFOA	* 2	141.61(c)	3	141.905(c)
36. PFOS	* 2	141.61(c)	3	141.905(c)
E. Volatile Organic Chemicals (VOCs)				
1. Benzene	2	141.61(a)	3	141.24(f)
2. Carbon tetrachloride	2	141.61(a)	3	141.24(f)

Contaminant	MCL/MRDL/TT violations <sup>2</sup>		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
3. Chlorobenzene (monochlorobenzene)	2	141.61(a)	3	141.24(f)
4. o-Dichlorobenzene	2	141.61(a)	3	141.24(f)
5. p-Dichlorobenzene	2	141.61(a)	3	141.24(f)
6. 1,2-Dichloroethane	2	141.61(a)	3	141.24(f)
7. 1,1-Dichloroethylene	2	141.61(a)	3	141.24(f)
8. cis-1,2-Dichloroethylene	2	141.61(a)	3	141.24(f)
9. trans-1,2-Dichloroethylene	2	141.61(a)	3	141.24(f)
10. Dichloromethane	2	141.61(a)	3	141.24(f)
11. 1,2-Dichloropropane	2	141.61(a)	3	141.24(f)
12. Ethylbenzene	2	141.61(a)	3	141.24(f)
13. Styrene	2	141.61(a)	3	141.24(f)
14. Tetrachloroethylene	2	141.61(a)	3	141.24(f)
15. Toluene	2	141.61(a)	3	141.24(f)
16. 1,2,4-Trichlorobenzene	2	141.61(a)	3	141.24(f)
17. 1,1,1-Trichloroethane	2	141.61(a)	3	141.24(f)
18. 1,1,2-Trichloroethane	2	141.61(a)	3	141.24(f)
19. Trichloroethylene	2	141.61(a)	3	141.24(f)
20. Vinyl chloride	2	141.61(a)	3	141.24(f)
21. Xylenes (total)	2	141.61(a)	3	141.24(f)
F. Radioactive Contaminants				
1. Beta/photon emitters	2	141.66(d)	3	141.25(a) 141.26(b)
2. Alpha emitters	2	141.66(c)	3	141.25(a) 141.26(a)
3. Combined radium (226 and 228)	2	141.66(b)	3	141.25(a) 141.26(a)
4. Uranium	<sup>9</sup> 2	141.66(e)	<sup>10</sup> 3	141.25(a) 141.26(a)
G. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfectant Residuals. Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA sets standards				

Contaminant	MCL/MRDL/TT violations <sup>2</sup>		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs). <sup>13</sup>				
1. Total trihalomethanes (TTHMs)	2	<sup>14</sup> 141.64(b)	3	141.132(a)-(b), 141.600-141.605, 141.620-141.629
2. Haloacetic Acids (HAA5)	2	141.64(b)	3	141.132(a)-(b), 141.600-141.605, 141.620-141.629
3. Bromate	2	141.64(a)	3	141.132(a)-(b)
4. Chlorite	2	141.64(a)	3	141.132(a)-(b)
5. Chlorine (MRDL)	2	141.65(a)	3	141.132(a), (c)
6. Chloramine (MRDL)	2	141.65(a)	3	141.132(a), (c)
7. Chlorine dioxide (MRDL), where any 2 consecutive daily samples at entrance to distribution system only are above MRDL	2	141.65(a), 141.133(c)(3)	<sup>215</sup> , 3	141.132(a), (c), 141.133(c)(2)
8. Chlorine dioxide (MRDL), where sample(s) in distribution system the next day are also above MRDL	<sup>16</sup> 1	141.65(a), 141.133(c)(3)	1	141.132(a), (c), 141.133(c)(2)
9. Control of DBP precursors—TOC (TT)	2	141.135(a)-(b)	3	141.132(a), (d)
10. Bench marking and disinfection profiling	N/A	N/A	3	141.172 141.530-141.544.
11. Development of monitoring plan	N/A	N/A	3	141.132(f)
H. Other Treatment Techniques				
1. Acrylamide (TT)	2	141.111	N/A	N/A
2. Epichlorohydrin (TT)	2	141.111	N/A	N/A
II. Unregulated Contaminant Monitoring: <sup>17</sup>				
A. Unregulated contaminants	N/A	N/A	3	141.40
B. Nickel	N/A	N/A	3	141.23(c), (k)
III. Public Notification for Variances and Exemptions:				
A. Operation under a variance or exemption	3	<sup>18</sup> 1415, 1416,	N/A	N/A
B. Violation of conditions of a variance	2	1415, 1416, <sup>19</sup>	N/A	N/A

Contaminant	MCL/MRDL/TT violations <sup>2</sup>		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
or exemption		142.307		
IV. Other Situations Requiring Public Notification:				
A. Fluoride secondary maximum contaminant level (SMCL) exceedance	3	143.3	N/A	N/A
B. Exceedance of nitrate MCL for non-community systems, as allowed by primacy agency	1	141.11(d)	N/A	N/A
C. Availability of unregulated contaminant monitoring data	3	141.40	N/A	N/A
D. Waterborne disease outbreak	1	141.2, 141.71(c)(2)(ii)	N/A	N/A
E. Other waterborne emergency <sup>20</sup>	1	N/A	N/A	N/A
F. Source Water Sample Positive for GWR Fecal indicators: E. coli, enterococci, or coliphage	1	141.402(g)	N/A	N/A
G. Other situations as determined by primacy agency	<sup>21</sup> 1, 2, 3	N/A	N/A	N/A

## Appendix A—Endnotes

† Until March 31, 2016.

‡ Beginning April 1, 2016.

\* Beginning April 26, 2029.

- Violations and other situations not listed in this table (e.g., failure to prepare Consumer Confidence Reports), do not require notice, unless otherwise determined by the primacy agency. Primacy agencies may, at their option, also require a more stringent public notice tier (e.g., Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Appendix, as authorized under § 141.202(a) and § 141.203(a).
- MCL—Maximum contaminant level, MRDL—Maximum residual disinfectant level, TT—Treatment technique
- The term Violations of National Primary Drinking Water Regulations (NPDWR) is used here to include violations of MCL, MRDL, treatment technique, monitoring, and testing procedure requirements.



4. Failure to test for fecal coliform or E. coli is a Tier 1 violation if testing is not done after any repeat sample tests positive for coliform. All other total coliform monitoring and testing procedure violations are Tier 3.
5. Systems that violate the turbidity MCL of 5 NTU based on an average of measurements over two consecutive days must consult with the primacy agency within 24 hours after learning of the violation. Based on this consultation, the primacy agency may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the primacy agency in the 24-hour period, the violation is automatically elevated to Tier 1.
6. Systems with treatment technique violations involving a single exceedance of a maximum turbidity limit under the Surface Water Treatment Rule (SWTR), the Interim Enhanced Surface Water Treatment Rule (IESWTR), or the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) are required to consult with the primacy agency within 24 hours after learning of the violation. Based on this consultation, the primacy agency may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the primacy agency in the 24-hour period, the violation is automatically elevated to Tier 1.
7. Most of the requirements of the Interim Enhanced Surface Water Treatment Rule (63 FR 69477) (§§ 141.170-141.171, 141.173-141.174) become effective January 1, 2002 for Subpart H systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 persons. However, § 141.172 has some requirements that become effective as early as April 16, 1999. The Surface Water Treatment Rule remains in effect for systems serving at least 10,000 persons even after 2002; the Interim Enhanced Surface Water Treatment Rule adds additional requirements and does not in many cases supersede the SWTR.
8. The arsenic MCL citations are effective January 23, 2006. Until then, the citations are § 141.11(b) and § 141.23(n).
9. The uranium MCL Tier 2 violation citations are effective December 8, 2003 for all community water systems.
10. The uranium Tier 3 violation citations are effective December 8, 2000 for all community water systems.
11. The arsenic Tier 3 violation MCL citations are effective January 23, 2006. Until then, the citations are § 141.23(a), (l).
12. Failure to take a confirmation sample within 24 hours for nitrate or nitrite after an initial sample exceeds the MCL is a Tier 1 violation. Other monitoring violations for nitrate are Tier 3.
13. Subpart H community and non-transient non-community systems serving  $\geq 10,000$  must comply with new DBP MCLs, disinfectant MRDLs, and related monitoring requirements beginning January 1, 2002. All other community and non-transient non-community systems must meet the MCLs and MRDLs beginning January 1, 2004. Subpart H transient non-community systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. Subpart H transient non-community systems serving fewer than 10,000 persons and using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.
14. §§ 141.64(b)(1) 141.132(a)-(b) apply until §§ 141.620-141.630 take effect under the schedule in § 141.620(c).
15. Failure to monitor for chlorine dioxide at the entrance to the distribution system the day after exceeding the MRDL at the entrance to the distribution system is a Tier 2 violation.

16. If any daily sample taken at the entrance to the distribution system exceeds the MRDL for chlorine dioxide and one or more samples taken in the distribution system the next day exceed the MRDL, Tier 1 notification is required. Failure to take the required samples in the distribution system after the MRDL is exceeded at the entry point also triggers Tier 1 notification.
17. Some water systems must monitor for certain unregulated contaminants listed in § 141.40.
18. This citation refers to §§ 1415 and 1416 of the Safe Drinking Water Act. §§ 1415 and 1416 require that “a schedule prescribed. . . for a public water system granted a variance [or exemption] shall require compliance by the system. . .”
19. In addition to §§ 1415 and 1416 of the Safe Drinking Water Act, 40 CFR 142.307 specifies the items and schedule milestones that must be included in a variance for small systems.
20. Other waterborne emergencies require a Tier 1 public notice under § 141.202(a) for situations that do not meet the definition of a waterborne disease outbreak given in 40 CFR 141.2 but that still have the potential to have serious adverse effects on health as a result of short-term exposure. These could include outbreaks not related to treatment deficiencies, as well as situations that have the potential to cause outbreaks, such as failures or significant interruption in water treatment processes, natural disasters that disrupt the water supply or distribution system, chemical spills, or unexpected loading of possible pathogens into the source water.
21. Primacy agencies may place other situations in any tier they believe appropriate, based on threat to public health.
22. Failure to collect three or more samples for *Cryptosporidium* analysis is a Tier 2 violation requiring special notice as specified in § 141.211. All other monitoring and testing procedure violations are Tier 3.
23. Systems that violate the Hazard Index MCL and one or more individual MCLs based on the same contaminants may issue one notification to satisfy the public notification requirements for multiple violations pursuant to § 141.203.

[65 FR 26035, May 4, 2000, as amended at 65 FR 76750, Dec. 7, 2000; 66 FR 7065, Jan. 22, 2001; 66 FR 31104, June 8, 2001; 67 FR 1836, Jan. 14, 2002; 69 FR 38856, June 29, 2004; 71 FR 483, Jan. 4, 2006; 71 FR 768, Jan. 5, 2006; 71 FR 65652, Nov. 8, 2006; 78 FR 10350, Feb. 13, 2013; 79 FR 10669, Feb. 26, 2014; 89 FR 32749, Apr. 26, 2024; 89 FR 86663, Oct. 30, 2024]

Appendix B to Subpart Q of Part 141—Standard Health Effects Language for Public Notification

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR)			
A. Microbiological Contaminants			
1a. Total coliform †	Zero	See footnote <sup>3</sup>	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful,

<sup>1</sup> MCLG—Maximum contaminant level goal.  
<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
1b. Fecal coliform/ <i>E. coli</i> †	Zero	Zero	bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. Fecal coliforms and <i>E. coli</i> are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
1c. Fecal indicators (GWR):	Zero	TT	Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
i. <i>E. coli</i>	None	TT	
ii. enterococci	None	TT	
iii. coliphage			
1d. Ground Water Rule (GWR) TT violations	None	TT	Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.
1e. Subpart Y Coliform Assessment and/or Corrective Action Violations ‡	N/A	TT	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system. We found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessments to identify problems and to correct any problems that are found.

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
1f. Subpart Y <i>E.coli</i> Assessment and/or Corrective Action Violations ‡	N/A	TT	<p>[THE SYSTEM MUST USE THE FOLLOWING APPLICABLE SENTENCES.]</p> <p>We failed to conduct the required assessment.</p> <p>We failed to correct all identified sanitary defects that were found during the assessment(s).</p> <p><i>E. coli</i> are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems. We violated the standard for <i>E. coli</i>, indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct a detailed assessment to identify problems and to correct any problems that are found.</p> <p>[THE SYSTEM MUST USE THE FOLLOWING APPLICABLE SENTENCES.]</p> <p>We failed to conduct the required assessment.</p> <p>We failed to correct all identified sanitary defects that were found during the assessment that we conducted.</p> <p><i>E. coli</i> are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems.</p>
1g. <i>E. coli</i> ‡	Zero	In compliance unless one of the following conditions occurs: (1) The system has an <i>E. coli</i> -positive	<p><i>E. coli</i> are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems.</p>

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
		<p>repeat sample following a total coliform-positive routine sample.</p> <p>(2) The system has a total coliform-positive repeat sample following an <i>E. coli</i>-positive routine sample.</p> <p>(3) The system fails to take all required repeat samples following an <i>E. coli</i>-positive routine sample.</p> <p>(4) The system fails to test for <i>E. coli</i> when any repeat sample tests positive for total</p>	

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<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
1h. Subpart Y Seasonal System TT Violations ‡	N/A	coliform. TT	When this violation includes the failure to monitor for total coliforms or <i>E. coli</i> prior to serving water to the public, the mandatory language found at 141.205(d)(2) must be used.  When this violation includes failure to complete other actions, the appropriate elements found in 141.205(a) to describe the violation must be used.
2a. Turbidity (MCL) <sup>4</sup>	None	1 NTU <sup>5</sup> /5 NTU	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
2b. Turbidity (SWTR TT) <sup>6</sup>	None	TT <sup>7</sup>	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
2c. Turbidity (IESWTR TT and LT1ESWTR TT) <sup>8</sup>	None	TT	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.

B. Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR), Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) and the Filter Backwash Recycling Rule (FBRR) violations

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<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
3. <i>Giardia lamblia</i> (SWTR/IESWTR/LT1ESWTR)	Zero	TT <sup>10</sup>	Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
4. Viruses (SWTR/IESWTR/LT1ESWTR)			
5. Heterotrophic plate count (HPC) bacteria <sup>9</sup> (SWTR/IESWTR/LT1ESWTR)			
6. <i>Legionella</i> (SWTR/IESWTR/LT1ESWTR)			
7. <i>Cryptosporidium</i> (IESWTR/FBRR/LT1ESWTR)			

C. Inorganic Chemicals (IOCs)

8. Antimony	0.006	0.006	Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
9. Arsenic <sup>11</sup>	0	0.010	Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.
10. Asbestos (10 µm)	7 MFL <sup>12</sup>	7 MFL	Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.
11. Barium	2	2	Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
12. Beryllium	0.004	0.004	Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
13. Cadmium	0.005	0.005	Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.
14. Chromium (total)	0.1	0.1	Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.
15. Cyanide	0.2	0.2	Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.
16. Fluoride	4.0	4.0	Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Fluoride in drinking water at half the MCL or more may cause mottling of children's teeth, usually in children less than nine years old. Mottling, also known as dental fluorosis, may include brown staining and/or pitting of the teeth, and occurs only in developing teeth before they erupt from the gums.
17. Mercury (inorganic)	0.002	0.002	Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.
18. Nitrate	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
19. Nitrite	1	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
20. Total Nitrate and Nitrite	10	10	Infants below the age of six months who drink water containing nitrate and nitrite in

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.



Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
21. Selenium	0.05	0.05	excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.
22. Thallium	0.0005	0.002	Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.
D. LEAD AND COPPER RULE			
23. Lead	zero	TT <sup>13</sup>	There is no safe level of lead in drinking water. Exposure to lead in drinking water can cause serious health effects in all age groups, especially pregnant people, infants (both formula-fed and breastfed), and young children. Some of the health effects to infants and children include decreases in IQ and attention span. Lead exposure can also result in new or worsened learning and behavior problems. The children of persons who are exposed to lead before or during pregnancy may be at increased risk of these harmful health effects. Adults have increased risks of heart disease, high blood pressure, kidney or nervous system problems. Contact your health care provider for more information about your risks.
24. Copper	1.3	TT <sup>14</sup>	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
			Disease should consult their personal doctor.
E. Synthetic Organic Chemicals (SOCs)			
25. 2,4-D	0.07	0.07	Some people who drink water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands.
26. 2,4,5-TP (Silvex)	0.05	0.05	Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.
27. Alachlor	Zero	0.002	Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.
28. Atrazine	0.003	0.003	Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.
29. Benzo(a)pyrene (PAHs)	Zero	0.0002	Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
30. Carbofuran	0.04	0.04	Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.
31. Chlordane	Zero	0.002	Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.
32. Dalapon	0.2	0.2	Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.
33. Di(2-ethylhexyl)	0.4	0.4	Some people who drink water containing

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<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
adipate			di(2-ethylhexyl) adipate well in excess of the MCL over many years could experience toxic effects such as weight loss, liver enlargement or possible reproductive difficulties.
34. Di(2-ethylhexyl) phthalate	Zero	0.006	Some people who drink water containing di(2-ethylhexyl) phthalate well in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.
35. Dibromochloropropane (DBCP)	Zero	0.0002	Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
36. Dinoseb	0.007	0.007	Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
37. Dioxin (2,3,7,8-TCDD)	Zero	$3 \times 10^{-8}$	Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
38. Diquat	0.02	0.02	Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.
39. Endothall	0.1	0.1	Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.
40. Endrin	0.002	0.002	Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.
41. Ethylene dibromide	Zero	0.00005	Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
42. Glyphosate	0.7	0.7	increased risk of getting cancer. Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.
43. Heptachlor	Zero	0.0004	Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.
44. Heptachlor epoxide	Zero	0.0002	Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.
45. Hexachlorobenzene	Zero	0.001	Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.
46. Hexachlorocyclopentadiene	0.05	0.05	Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.
47. Lindane	0.0002	0.0002	Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.
48. Methoxychlor	0.04	0.04	Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
49. Oxamyl (Vydate)	0.2	0.2	Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.
50. Pentachlorophenol	Zero	0.001	Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
51. Picloram	0.5	0.5	with their liver or kidneys, and may have an increased risk of getting cancer. Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.
52. Polychlorinated biphenyls (PCBs)	Zero	0.0005	Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.
53. Simazine	0.004	0.004	Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.
54. Toxaphene	Zero	0.003	Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.
55. Hazard Index PFAS (HFPO-DA, PFBS, PFHxS, and PFNA)	1 (unitless)	1 (unitless)	Per- and polyfluoroalkyl substances (PFAS) can persist in the human body and exposure may lead to increased risk of adverse health effects. Low levels of multiple PFAS that individually would not likely result in increased risk of adverse health effects may result in adverse health effects when combined in a mixture. Some people who consume drinking water containing mixtures of PFAS in excess of the Hazard Index (HI) MCL may have increased health risks such as liver, immune, and thyroid effects following exposure over many years and developmental and thyroid effects following repeated exposure during pregnancy and/or childhood.
56. HFPO-DA	0.00001	0.00001	Some people who drink water containing HFPO-DA in excess of the MCL over many years may have increased health risks such

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
57. PFHxS	0.00001	0.00001	as immune, liver, and kidney effects. There is also a potential concern for cancer associated with HFPO-DA exposure. In addition, there may be increased risks of developmental effects for people who drink water containing HFPO-DA in excess of the MCL following repeated exposure during pregnancy and/or childhood. Some people who drink water containing PFHxS in excess of the MCL over many years may have increased health risks such as immune, thyroid, and liver effects. In addition, there may be increased risks of developmental effects for people who drink water containing PFHxS in excess of the MCL following repeated exposure during pregnancy and/or childhood.
58. PFNA	0.00001	0.00001	Some people who drink water containing PFNA in excess of the MCL over many years may have increased health risks such as elevated cholesterol levels, immune effects, and liver effects. In addition, there may be increased risks of developmental effects for people who drink water containing PFNA in excess of the MCL following repeated exposure during pregnancy and/or childhood.
59. PFOA	Zero	0.0000040	Some people who drink water containing PFOA in excess of the MCL over many years may have increased health risks such as cardiovascular, immune, and liver effects, as well as increased incidence of certain types of cancers including kidney and testicular cancer. In addition, there may be increased risks of developmental and immune effects for people who drink water containing PFOA in excess of the MCL following repeated exposure during pregnancy and/or childhood.
60. PFOS	Zero	0.0000040	Some people who drink water containing PFOS in excess of the MCL over many years

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
			may have increased health risks such as cardiovascular, immune, and liver effects, as well as increased incidence of certain types of cancers including liver cancer. In addition, there may be increased risks of developmental and immune effects for people who drink water containing PFOS in excess of the MCL following repeated exposure during pregnancy and/or childhood.
F. Volatile Organic Chemicals (VOCs)			
61. Benzene	Zero	0.005	Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.
62. Carbon tetrachloride	Zero	0.005	Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
63. Chlorobenzene (monochloro- benzene)	0.1	0.1	Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.
64. o-Dichlorobenzene	0.6	0.6	Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.
65. p-Dichlorobenzene	0.075	0.075	Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.
66. 1,2-Dichloroethane	Zero	0.005	Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
67. 1,1-Dichloroethylene	0.007	0.007	Some people who drink water containing

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
68. <i>cis</i> -1,2-Dichloroethylene	0.07	0.07	1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver. Some people who drink water containing <i>cis</i> -1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
69. <i>trans</i> -1,2-Dichloroethylene	0.1	0.1	Some people who drink water containing <i>trans</i> -1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.
70. Dichloromethane	Zero	0.005	Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.
71. 1,2-Dichloropropane	Zero	0.005	Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
72. Ethylbenzene	0.7	0.7	Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
73. Styrene	0.1	0.1	Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.
74. Tetrachloroethylene	Zero	0.005	Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.
75. Toluene	1	1	Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.
76. 1,2,4-Trichlorobenzene	0.07	0.07	Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.



Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
77. 1,1,1-Trichloroethane	0.2	0.2	changes in their adrenal glands. Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.
78. 1,1,2-Trichloroethane	0.003	0.005	Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.
79. Trichloroethylene	Zero	0.005	Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
80. Vinyl chloride	Zero	0.002	Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
75. Xylenes (total)	10	10	Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.
G. Radioactive Contaminants			
81. Beta/photon emitters	Zero	4 mrem/yr <sup>15</sup>	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
82. Alpha emitters	Zero	17 pCi/L <sup>17</sup>	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
83. Combined radium (226 & 228)	Zero	5 pCi/L	Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
84. Uranium <sup>16</sup>	Zero	30 µg/L	Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.
H. Disinfection Byproducts (DBPs), Byproduct Precursors, and Disinfectant Residuals: Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs) <sup>18</sup>			
85. Total trihalomethanes (TTHMs)	N/A	0.080 <sup>19 20</sup>	Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.
86. Haloacetic Acids (HAA)	N/A	0.060 <sup>21</sup>	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
87. Bromate	Zero	0.010	Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.
88. Chlorite	0.08	1.0	Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia.
89. Chlorine	4 (MRDLG) <sup>22</sup>	4.0 (MRDL) <sup>23</sup>	Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.
90. Chloramines	4 (MRDLG)	4.0 (MRDL)	Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
91. Chlorine dioxide, where any 2 consecutive daily samples taken at the entrance to the distribution system are above the MRDL	0.8 (MRDLG)	0.8 (MRDL)	<p>eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.</p> <p>Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.</p> <p><i>Add for public notification only:</i> The chlorine dioxide violations reported today are the result of exceedances at the treatment facility only, not within the distribution system which delivers water to consumers. Continued compliance with chlorine dioxide levels within the distribution system minimizes the potential risk of these violations to consumers.</p>
92. Chlorine dioxide, where one or more distribution system samples are above the MRDL	0.8 (MRDLG)	0.8 (MRDL)	<p>Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.</p> <p><i>Add for public notification only:</i> The chlorine dioxide violations reported today include exceedances of the EPA standard within the distribution system which delivers water to consumers. Violations of the chlorine dioxide standard within the distribution system may harm human health based on short-term exposures. Certain groups, including fetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure.</p>

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

Contaminant	MCLG <sup>1</sup> mg/L	MCL <sup>2</sup> mg/L	Standard health effects language for public notification
93. Control of DBP precursors (TOC)	None	TT	Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer.
I. Other Treatment Techniques			
94. Acrylamide	Zero	TT	Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.
95. Epichlorohydrin	Zero	TT	Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.

<sup>1</sup> MCLG—Maximum contaminant level goal.

<sup>2</sup> MCL—Maximum contaminant level.

## Appendix B—Endnotes

† Until March 31, 2016.

‡ Beginning April 1, 2016.

1. MCLG—Maximum contaminant level goal
2. MCL—Maximum contaminant level
3. For water systems analyzing at least 40 samples per month, no more than 5.0 percent of the monthly samples may be positive for total coliforms. For systems analyzing fewer than 40 samples per month, no more than one sample per month may be positive for total coliforms.

4. There are various regulations that set turbidity standards for different types of systems, including 40 CFR 141.13, and the 1989 Surface Water Treatment Rule, the 1998 Interim Enhanced Surface Water Treatment Rule and the 2002 Long Term 1 Enhanced Surface Water Treatment Rule. The MCL for the monthly turbidity average is 1 NTU; the MCL for the 2-day average is 5 NTU for systems that are required to filter but have not yet installed filtration (40 CFR 141.13).
5. NTU—Nephelometric turbidity unit
6. There are various regulations that set turbidity standards for different types of systems, including 40 CFR 141.13, and the 1989 Surface Water Treatment Rule, the 1998 Interim Enhanced Surface Water Treatment Rule and the 2001 Long Term 1 Enhanced Surface Water Treatment Rule. Systems subject to the Surface Water Treatment Rule (both filtered and unfiltered) may not exceed 5 NTU. In addition, in filtered systems, 95 percent of samples each month must not exceed 0.5 NTU in systems using conventional or direct filtration and must not exceed 1 NTU in systems using slow sand or diatomaceous earth filtration or other filtration technologies approved by the primacy agency.
7. TT—Treatment technique
8. There are various regulations that set turbidity standards for different types of systems, including 40 CFR 141.13, the 1989 Surface Water Treatment Rule (SWTR), the 1998 Interim Enhanced Surface Water Treatment Rule (IESWTR) and the 2002 Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR). For systems subject to the IESWTR (systems serving at least 10,000 people, using surface water or ground water under the direct influence of surface water), that use conventional filtration or direct filtration, after January 1, 2002, the turbidity level of a system's combined filter effluent may not exceed 0.3 NTU in at least 95 percent of monthly measurements, and the turbidity level of a system's combined filter effluent must not exceed 1 NTU at any time. Systems subject to the IESWTR using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration must meet turbidity limits set by the primacy agency. For systems subject to the LT1ESWTR (systems serving fewer than 10,000 people, using surface water or ground water under the direct influence of surface water) that use conventional filtration or direct filtration, after January 1, 2005, the turbidity level of a system's combined filter effluent may not exceed 0.3 NTU in at least 95 percent of monthly measurements, and the turbidity level of a system's combined filter effluent must not exceed 1 NTU at any time. Systems subject to the LT1ESWTR using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration must meet turbidity limits set by the primacy agency.
9. The bacteria detected by heterotrophic plate count (HPC) are not necessarily harmful. HPC is simply an alternative method of determining disinfectant residual levels. The number of such bacteria is an indicator of whether there is enough disinfectant in the distribution system.
10. SWTR, IESWTR, and LT1ESWTR treatment technique violations that involve turbidity exceedances may use the health effects language for turbidity instead.
11. These arsenic values are effective January 23, 2006. Until then, the MCL is 0.05 mg/L and there is no MCLG.
12. Millions fibers per liter.
13. Action Level = 0.010 mg/L
14. Action Level = 1.3 mg/L
15. Millirems per years

16. The uranium MCL is effective December 8, 2003 for all community water systems.
17. Picocuries per liter
18. Surface water systems and ground water systems under the direct influence of surface water are regulated under subpart H of 40 CFR 141. Subpart H community and non-transient non-community systems serving  $\geq 10,000$  must comply with subpart L DBP MCLs and disinfectant maximum residual disinfectant levels (MRDLs) beginning January 1, 2002. All other community and non-transient non-community systems must comply with subpart L DBP MCLs and disinfectant MRDLs beginning January 1, 2004. Subpart H transient non-community systems serving  $\geq 10,000$  that use chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. All other transient non-community systems that use chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.
19. Community and non-transient non-community systems must comply with subpart V TTHM and HAA5 MCLs of 0.080 mg/L and 0.060 mg/L, respectively (with compliance calculated as a locational running annual average) on the schedule in § 141.620.
20. The MCL for total trihalomethanes is the sum of the concentrations of the individual trihalomethanes.
21. The MCL for haloacetic acids is the sum of the concentrations of the individual haloacetic acids.
22. MRDLG—Maximum residual disinfectant level goal.
23. MRDL—Maximum residual disinfectant level.

[65 FR 26043, May 4, 2000; 65 FR 38629, June 21, 2000; 65 FR 40521, 40522, June 30, 2000, as amended at 65 FR 76751, Dec. 7, 2000; 66 FR 7065, Jan. 22, 2001; 66 FR 31104, June 8, 2001; 67 FR 1838, Jan. 14, 2002; 67 FR 70857, Nov. 27, 2002; 68 FR 14507, Mar. 25, 2003; 69 FR 38856, June 29, 2004; 71 FR 483, Jan. 4, 2006; 71 FR 65653, Nov. 8, 2006; 78 FR 10351, Feb. 13, 2013; 86 FR 4310, Jan. 15, 2021; 89 FR 32749, Apr. 26, 2024; 89 FR 86664, Oct. 30, 2024]

## Appendix C to Subpart Q of Part 141—List of Acronyms Used in Public Notification Regulation

CCR Consumer Confidence Report

CWS Community Water System

DBP Disinfection Byproduct

EPA Environmental Protection Agency

GWR Ground Water Rule

HI Hazard Index

HPC Heterotrophic Plate Count

IESWTR Interim Enhanced Surface Water Treatment Rule

IOC Inorganic Chemical

LCR Lead and Copper Rule

MCL Maximum Contaminant Level

MCLG Maximum Contaminant Level Goal

MRDL Maximum Residual Disinfectant Level

MRDLG Maximum Residual Disinfectant Level Goal

NCWS Non-Community Water System

NPDWR National Primary Drinking Water Regulation

NTNCWS Non-Transient Non-Community Water System

NTU Nephelometric Turbidity Unit

OGWDW Office of Ground Water and Drinking Water

OW Office of Water

PFAS Per- and Polyfluoroalkyl Substances

PN Public Notification

PWS Public Water System

SDWA Safe Drinking Water Act

SMCL Secondary Maximum Contaminant Level

SOC Synthetic Organic Chemical

SWTR Surface Water Treatment Rule

TCR Total Coliform Rule

TT Treatment Technique

TWS Transient Non-Community Water System

VOC Volatile Organic Chemical

*[65 FR 26035, May 4, 2000, as amended at 71 FR 65653, Nov. 8, 2006; 89 FR 32750, Apr. 26, 2024]*

## Subpart R [Reserved]

## Subpart S—Ground Water Rule

**Source:** 71 FR 65653, Nov. 8, 2006, unless otherwise noted.

### § 141.400 General requirements and applicability.

- (a) **Scope of this subpart.** The requirements of this subpart S constitute National Primary Drinking Water Regulations.
- (b) **Applicability.** This subpart applies to all public water systems that use ground water except that it does not apply to public water systems that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment under subpart H. For the purposes of this subpart, “ground water system” is defined as any public water system meeting this applicability statement, including consecutive systems receiving finished ground water.
- (c) **General requirements.** Systems subject to this subpart must comply with the following requirements:
  - (1) Sanitary survey information requirements for all ground water systems as described in § 141.401.
  - (2) Microbial source water monitoring requirements for ground water systems that do not treat all of their ground water to at least 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer as described in § 141.402.
  - (3) Treatment technique requirements, described in § 141.403, that apply to ground water systems that have fecally contaminated source waters, as determined by source water monitoring conducted under § 141.402, or that have significant deficiencies that are identified by the State or that are identified by EPA under SDWA section 1445. A ground water system with fecally contaminated source water or with significant deficiencies subject to the treatment technique requirements of this subpart must implement one or more of the following corrective action options: correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer.
  - (4) Ground water systems that provide at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer are required to conduct compliance monitoring to demonstrate treatment effectiveness, as described in § 141.403(b).
  - (5) If requested by the State, ground water systems must provide the State with any existing information that will enable the State to perform a hydrogeologic sensitivity assessment. For the purposes of this subpart, “hydrogeologic sensitivity assessment” is a determination of whether ground water systems obtain water from hydrogeologically sensitive settings.
- (d) **Compliance date.** Ground water systems must comply, unless otherwise noted, with the requirements of this subpart beginning December 1, 2009.



### § 141.401 Sanitary surveys for ground water systems.

- (a) Ground water systems must provide the State, at the State's request, any existing information that will enable the State to conduct a sanitary survey.
- (b) For the purposes of this subpart, a "sanitary survey," as conducted by the State, includes but is not limited to, an onsite review of the water source(s) (identifying sources of contamination by using results of source water assessments or other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system to evaluate the adequacy of the system, its sources and operations and the distribution of safe drinking water.
- (c) The sanitary survey must include an evaluation of the applicable components listed in paragraphs (c)(1) through (8) of this section:
  - (1) Source,
  - (2) Treatment including corrosion control treatment and water quality parameters as applicable;
  - (3) Distribution system,
  - (4) Finished water storage,
  - (5) Pumps, pump facilities, and controls,
  - (6) Monitoring, reporting, and data verification,
  - (7) System management and operation, and
  - (8) Operator compliance with State requirements.

[71 FR 65653, Nov. 8, 2006, as amended at 86 FR 4310, Jan. 15, 2021]

### § 141.402 Ground water source microbial monitoring and analytical methods.

- (a) *Triggered source water monitoring* —
  - (1) **General requirements.** A ground water system must conduct triggered source water monitoring if the conditions identified in paragraphs (a)(1)(i) and either (a)(1)(ii) or (a)(1)(iii) of this section exist.
    - (i) The system does not provide at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for each ground water source; and either
    - (ii) The system is notified that a sample collected under § 141.21(a) is total coliform-positive and the sample is not invalidated under § 141.21(c) until March 31, 2016, or
    - (iii) The system is notified that a sample collected under §§ 141.854 through 141.857 is total coliform-positive and the sample is not invalidated under § 141.853(c) beginning April 1, 2016.
  - (2) **Sampling requirements.** A ground water system must collect, within 24 hours of notification of the total coliform-positive sample, at least one ground water source sample from each ground water source in use at the time the total coliform-positive sample was collected under § 141.21(a) until March 31, 2016, or collected under §§ 141.854 through 141.857 beginning April 1, 2016, except as provided in paragraph (a)(2)(ii) of this section.

- (i) The State may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the ground water source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the State must specify how much time the system has to collect the sample.
  - (ii) If approved by the State, systems with more than one ground water source may meet the requirements of this paragraph (a)(2) by sampling a representative ground water source or sources. If directed by the State, systems must submit for State approval a triggered source water monitoring plan that identifies one or more ground water sources that are representative of each monitoring site in the system's sample siting plan under § 141.21(a) until March 31, 2016, or under § 141.853 beginning April 1, 2016, and that the system intends to use for representative sampling under this paragraph.
  - (iii) Until March 31, 2016, a ground water system serving 1,000 or fewer people may use a repeat sample collected from a ground water source to meet both the requirements of § 141.21(b) and to satisfy the monitoring requirements of paragraph (a)(2) of this section for that ground water source only if the State approves the use of *E. coli* as a fecal indicator for source water monitoring under this paragraph (a). If the repeat sample collected from the ground water source is *E. coli*-positive, the system must comply with paragraph (a)(3) of this section.
  - (iv) Beginning April 1, 2016, a ground water system serving 1,000 or fewer people may use a repeat sample collected from a ground water source to meet both the requirements of subpart Y and to satisfy the monitoring requirements of paragraph (a)(2) of this section for that ground water source only if the State approves the use of *E. coli* as a fecal indicator for source water monitoring under this paragraph (a) and approves the use of a single sample for meeting both the triggered source water monitoring requirements in this paragraph (a) and the repeat monitoring requirements in § 141.858. If the repeat sample collected from the ground water source is *E. coli*-positive, the system must comply with paragraph (a)(3) of this section.
- (3) **Additional requirements.** If the State does not require corrective action under § 141.403(a)(2) for a fecal indicator-positive source water sample collected under paragraph (a)(2) of this section that is not invalidated under paragraph (d) of this section, the system must collect five additional source water samples from the same source within 24 hours of being notified of the fecal indicator-positive sample.
- (4) **Consecutive and wholesale systems.**
- (i) In addition to the other requirements of this paragraph (a), a consecutive ground water system that has a total coliform-positive sample collected under § 141.21(a) until March 31, 2016, or under §§ 141.854 through 141.857 beginning April 1, 2016, must notify the wholesale system(s) within 24 hours of being notified of the total coliform-positive sample.
  - (ii) In addition to the other requirements of this paragraph (a), a wholesale ground water system must comply with paragraphs (a)(4)(ii)(A) and (a)(4)(ii)(B) of this section.
    - (A) A wholesale ground water system that receives notice from a consecutive system it serves that a sample collected under § 141.21(a) until March 31, 2016, or collected under §§ 141.854 through 141.857 beginning April 1, 2016, is total coliform-positive must, within 24 hours of being notified, collect a sample from its ground water source(s) under paragraph (a)(2) of this section and analyze it for a fecal indicator under paragraph (c) of this section.

- (B) If the sample collected under paragraph (a)(4)(ii)(A) of this section is fecal indicator-positive, the wholesale ground water system must notify all consecutive systems served by that ground water source of the fecal indicator source water positive within 24 hours of being notified of the ground water source sample monitoring result and must meet the requirements of paragraph (a)(3) of this section.
- (5) **Exceptions to the triggered source water monitoring requirements.** A ground water system is not required to comply with the source water monitoring requirements of paragraph (a) of this section if either of the following conditions exists:
  - (i) The State determines, and documents in writing, that the total coliform-positive sample collected under § 141.21(a) until March 31, 2016, or under §§ 141.854 through 141.857 beginning April 1, 2016, is caused by a distribution system deficiency; or
  - (ii) The total coliform-positive sample collected under § 141.21(a) until March 31, 2016, or under §§ 141.854 through 141.857 beginning April 1, 2016, is collected at a location that meets State criteria for distribution system conditions that will cause total coliform-positive samples.
- (b) **Assessment source water monitoring.** If directed by the State, ground water systems must conduct assessment source water monitoring that meets State-determined requirements for such monitoring. A ground water system conducting assessment source water monitoring may use a triggered source water sample collected under paragraph (a)(2) of this section to meet the requirements of paragraph (b) of this section. State-determined assessment source water monitoring requirements may include:
  - (1) Collection of a total of 12 ground water source samples that represent each month the system provides ground water to the public,
  - (2) Collection of samples from each well unless the system obtains written State approval to conduct monitoring at one or more wells within the ground water system that are representative of multiple wells used by that system and that draw water from the same hydrogeologic setting,
  - (3) Collection of a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used,
  - (4) Analysis of all ground water source samples using one of the analytical methods listed in the in paragraph (c)(2) of this section for the presence of *E. coli*, enterococci, or coliphage,
  - (5) Collection of ground water source samples at a location prior to any treatment of the ground water source unless the State approves a sampling location after treatment, and
  - (6) Collection of ground water source samples at the well itself unless the system's configuration does not allow for sampling at the well itself and the State approves an alternate sampling location that is representative of the water quality of that well.
- (c) **Analytical methods.**
  - (1) A ground water system subject to the source water monitoring requirements of paragraph (a) of this section must collect a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used.

- (2) A ground water system must analyze all ground water source samples collected under paragraph (a) of this section using one of the analytical methods listed in the following table in paragraph (c)(2) of this section or one of the alternative methods listed in appendix A to subpart C of this part for the presence of *E. coli*, enterococci, or coliphage:

## ANALYTICAL METHODS FOR SOURCE WATER MONITORING

Fecal indicator <sup>1</sup>	Methodology	Method citation
<i>E. coli</i>	Colilert <sup>3</sup>	9223 B. <sup>2</sup>
	Colisure <sup>3</sup>	9223 B. <sup>2</sup>
	Membrane Filter Method with MI Agar	EPA Method 1604. <sup>4</sup>
	m-ColiBlue24 Test <sup>5</sup>	
	E*Colite Test <sup>6</sup>	
	EC-MUG <sup>7</sup>	9221 F. <sup>2</sup>
	NA-MUG <sup>7</sup>	9222 G. <sup>2</sup>
Enterococci	Multiple-Tube Technique	9230B. <sup>2</sup>
	Membrane Filter Technique	9230C. <sup>2</sup>
	Membrane Filter Technique	EPA Method 1600. <sup>8</sup>
	Enterolert <sup>9</sup>	
Coliphage	Two-Step Enrichment Presence-Absence Procedure	EPA Method 1601. <sup>10</sup>
	Single Agar Layer Procedure	EPA Method 1602. <sup>11</sup>

*Analyses must be conducted in accordance with the documents listed below. The Director of the Federal Register approves the incorporation by reference of the documents listed in footnotes 2-11 in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Copies may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington DC 20460 (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).*

<sup>1</sup> The time from sample collection to initiation of analysis may not exceed 30 hours. The ground water system is encouraged but is not required to hold samples below 10 °C during transit.

<sup>2</sup> Methods are described in *Standard Methods for the Examination of Water and Wastewater* 20th edition (1998) and copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005-2605.

<sup>3</sup> Medium is available through IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092.

<sup>4</sup> EPA Method 1604: Total Coliforms and *Escherichia coli* in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium); September 2002, EPA 821-R-02-024. Method is available at <http://www.epa.gov/nerlcwww/1604sp02.pdf> or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

<sup>5</sup> A description of the m-ColiBlue24 Test, "Total Coliforms and *E. coli* Membrane Filtration Method with m-ColiBlue24 @ Broth," Method No. 10029 Revision 2, August 17, 1999, is available from Hach Company, 100 Dayton Ave., Ames, IA 50010 or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

<sup>6</sup> A description of the E\*Colite Test, "Charm E\*Colite Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Drinking Water, January 9, 1998, is available from Charm Sciences, Inc., 659 Andover St., Lawrence, MA 01843-1032 or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

<sup>7</sup> EC-MUG (Method 9221F) or NA-MUG (Method 9222G) can be used for *E. coli* testing step as described in § 141.21(f)(6)(i) or (ii) after use of Standard Methods 9221 B, 9221 D, 9222 B, or 9222 C.

<sup>8</sup> EPA Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl- $\beta$ -D-Glucoside Agar (mEI) EPA 821-R-02-022 (September 2002) is an approved variation of Standard Method 9230C. The method is available at <http://www.epa.gov/nerlcwww/1600sp02.pdf> or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460. The holding time and temperature for ground water samples are specified in footnote 1 above, rather than as specified in Section 8 of EPA Method 1600.

<sup>9</sup> Medium is available through IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092. Preparation and use of the medium is set forth in the article "Evaluation of Enterolert for Enumeration of Enterococci in Recreational Waters," by Budnick, G.E., Howard, R.T., and Mayo, D.R., 1996, *Applied and Environmental Microbiology*, 62:3881-3884.

<sup>10</sup> EPA Method 1601: Male-specific (F + ) and Somatic Coliphage in Water by Two-step Enrichment Procedure; April 2001, EPA 821-R-01-030. Method is available at <http://www.epa.gov/nerlcwww/1601ap01.pdf> or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

<sup>11</sup> EPA Method 1602: Male-specific (F + ) and Somatic Coliphage in Water by Single Agar Layer (SAL) Procedure; April 2001, EPA 821-R-01-029. Method is available at <http://www.epa.gov/nerlcwww/1602ap01.pdf> or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

**(d) Invalidation of a fecal indicator-positive ground water source sample.**

- (1) A ground water system may obtain State invalidation of a fecal indicator-positive ground water source sample collected under paragraph (a) of this section only under the conditions specified in paragraphs (d)(1)(i) and (ii) of this section.
  - (i) The system provides the State with written notice from the laboratory that improper sample analysis occurred; or
  - (ii) The State determines and documents in writing that there is substantial evidence that a fecal indicator-positive ground water source sample is not related to source water quality.
- (2) If the State invalidates a fecal indicator-positive ground water source sample, the ground water system must collect another source water sample under paragraph (a) of this section within 24 hours of being notified by the State of its invalidation decision and have it analyzed for the same fecal indicator using the analytical methods in paragraph (c) of this section. The State may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the State must specify how much time the system has to collect the sample.

**(e) Sampling location.**

- (1) Any ground water source sample required under paragraph (a) of this section must be collected at a location prior to any treatment of the ground water source unless the State approves a sampling location after treatment.

- (2) If the system's configuration does not allow for sampling at the well itself, the system may collect a sample at a State-approved location to meet the requirements of paragraph (a) of this section if the sample is representative of the water quality of that well.
- (f) **New sources.** If directed by the State, a ground water system that places a new ground water source into service after November 30, 2009, must conduct assessment source water monitoring under paragraph (b) of this section. If directed by the State, the system must begin monitoring before the ground water source is used to provide water to the public.
- (g) **Public notification.** A ground water system with a ground water source sample collected under paragraph (a) or (b) of this section that is fecal indicator-positive and that is not invalidated under paragraph (d) of this section, including consecutive systems served by the ground water source, must conduct public notification under § 141.202.
- (h) **Monitoring violations.** Failure to meet the requirements of paragraphs (a)-(f) of this section is a monitoring violation and requires the ground water system to provide public notification under § 141.204.

[71 FR 65653, Nov. 8, 2006; 71 FR 67427, Nov. 21, 2006, as amended at 74 FR 30958, June 29, 2009; 78 FR 10353, Feb. 13, 2013]

### § 141.403 Treatment technique requirements for ground water systems.

- (a) **Ground water systems with significant deficiencies or source water fecal contamination.**
  - (1) The treatment technique requirements of this section must be met by ground water systems when a significant deficiency is identified or when a ground water source sample collected under § 141.402(a)(3) is fecal indicator-positive.
  - (2) If directed by the State, a ground water system with a ground water source sample collected under § 141.402(a)(2), § 141.402(a)(4), or § 141.402(b) that is fecal indicator-positive must comply with the treatment technique requirements of this section.
  - (3) When a significant deficiency is identified at a Subpart H public water system that uses both ground water and surface water or ground water under the direct influence of surface water, the system must comply with provisions of this paragraph except in cases where the State determines that the significant deficiency is in a portion of the distribution system that is served solely by surface water or ground water under the direct influence of surface water.
  - (4) Unless the State directs the ground water system to implement a specific corrective action, the ground water system must consult with the State regarding the appropriate corrective action within 30 days of receiving written notice from the State of a significant deficiency, written notice from a laboratory that a ground water source sample collected under § 141.402(a)(3) was found to be fecal indicator-positive, or direction from the State that a fecal indicator-positive collected under § 141.402(a)(2), § 141.402(a)(4), or § 141.402(b) requires corrective action. For the purposes of this subpart, 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 State determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

- (5) Within 120 days (or earlier if directed by the State) of receiving written notification from the State of a significant deficiency, written notice from a laboratory that a ground water source sample collected under § 141.402(a)(3) was found to be fecal indicator-positive, or direction from the State that a fecal indicator-positive sample collected under § 141.402(a)(2), § 141.402(a)(4), or § 141.402(b) requires corrective action, the ground water system must either:
  - (i) Have completed corrective action in accordance with applicable State plan review processes or other State guidance or direction, if any, including State-specified interim measures; or
  - (ii) Be in compliance with a State-approved corrective action plan and schedule subject to the conditions specified in paragraphs (a)(5)(ii)(A) and (a)(5)(ii)(B) of this section.
    - (A) Any subsequent modifications to a State-approved corrective action plan and schedule must also be approved by the State.
    - (B) If the State specifies interim measures for protection of the public health pending State approval of the corrective action plan and schedule or pending completion of the corrective action plan, the system must comply with these interim measures as well as with any schedule specified by the State.
- (6) **Corrective action alternatives.** Ground water systems that meet the conditions of paragraph (a)(1) or (a)(2) of this section must implement one or more of the following corrective action alternatives:
  - (i) Correct all significant deficiencies;
  - (ii) Provide an alternate source of water;
  - (iii) Eliminate the source of contamination; or
  - (iv) Provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.
- (7) **Special notice to the public of significant deficiencies or source water fecal contamination.**
  - (i) In addition to the applicable public notification requirements of § 141.202, a community ground water system that receives notice from the State of a significant deficiency or notification of a fecal indicator-positive ground water source sample that is not invalidated by the State under § 141.402(d) must inform the public served by the water system under § 141.153(h)(6) of the fecal indicator-positive source sample or of any significant deficiency that has not been corrected. The system must continue to inform the public annually until the significant deficiency is corrected or the fecal contamination in the ground water source is determined by the State to be corrected under paragraph (a)(5) of this section.
  - (ii) In addition to the applicable public notification requirements of § 141.202, a non-community ground water system that receives notice from the State of a significant deficiency must inform the public served by the water system in a manner approved by the State of any significant deficiency that has not been corrected within 12 months of being notified by the State, or earlier if directed by the State. The system must continue to inform the public annually until the significant deficiency is corrected. The information must include:
    - (A) The nature of the significant deficiency and the date the significant deficiency was identified by the State;



- (B) The State-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed; and
  - (C) For systems with a large proportion of non-English speaking consumers, as determined by the State, information in the appropriate language(s) regarding the importance of the notice or a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.
- (iii) If directed by the State, a non-community water system with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how the deficiencies were corrected, and the dates of correction under paragraph (a)(7)(ii) of this section.

(b) *Compliance monitoring* —

- (1) **Existing ground water sources.** A ground water system that is not required to meet the source water monitoring requirements of this subpart for any ground water source because it provides at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for any ground water source before December 1, 2009, must notify the State in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the specified ground water source and begin compliance monitoring in accordance with paragraph (b)(3) of this section by December 1, 2009. Notification to the State must include engineering, operational, or other information that the State requests to evaluate the submission. If the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source, the system must conduct ground water source monitoring as required under § 141.402.
- (2) **New ground water sources.** A ground water system that places a ground water source in service after November 30, 2009, that is not required to meet the source water monitoring requirements of this subpart because the system provides at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source must comply with the requirements of paragraphs (b)(2)(i), (b)(2)(ii) and (b)(2)(iii) of this section.
- (i) The system must notify the State in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source. Notification to the State must include engineering, operational, or other information that the State requests to evaluate the submission.
  - (ii) The system must conduct compliance monitoring as required under § 141.403(b)(3) of this subpart within 30 days of placing the source in service.
  - (iii) The system must conduct ground water source monitoring under § 141.402 if the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.
- (3) **Monitoring requirements.** A ground water system subject to the requirements of paragraphs (a), (b)(1) or (b)(2) of this section must monitor the effectiveness and reliability of treatment for that ground water source before or at the first customer as follows:

(i) **Chemical disinfection** –

- (A) **Ground water systems serving greater than 3,300 people.** A ground water system that serves greater than 3,300 people must continuously monitor the residual disinfectant concentration using analytical methods specified in § 141.74(a)(2) at a location approved by the State and must record the lowest residual disinfectant concentration each day that water from the ground water source is served to the public. The ground water system must maintain the State-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. If there is a failure in the continuous monitoring equipment, the ground water system must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service. The system must resume continuous residual disinfectant monitoring within 14 days.
- (B) **Ground water systems serving 3,300 or fewer people.** A ground water system that serves 3,300 or fewer people must monitor the residual disinfectant concentration using analytical methods specified in § 141.74(a)(2) at a location approved by the State and record the residual disinfection concentration each day that water from the ground water source is served to the public. The ground water system must maintain the State-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. The ground water system must take a daily grab sample during the hour of peak flow or at another time specified by the State. If any daily grab sample measurement falls below the State-determined residual disinfectant concentration, the ground water system must take follow-up samples every four hours until the residual disinfectant concentration is restored to the State-determined level. Alternatively, a ground water system that serves 3,300 or fewer people may monitor continuously and meet the requirements of paragraph (b)(3)(i)(A) of this section.

(ii) **Membrane filtration.** A ground water system that uses membrane filtration to meet the requirements of this subpart must monitor the membrane filtration process in accordance with all State-specified monitoring requirements and must operate the membrane filtration in accordance with all State-specified compliance requirements. A ground water system that uses membrane filtration is in compliance with the requirement to achieve at least 4-log removal of viruses when:

- (A) The membrane has an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses;
- (B) The membrane process is operated in accordance with State-specified compliance requirements; and
- (C) The integrity of the membrane is intact.

(iii) **Alternative treatment.** A ground water system that uses a State-approved alternative treatment to meet the requirements of this subpart by providing at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer must:

- (A) Monitor the alternative treatment in accordance with all State-specified monitoring requirements; and

- (B) Operate the alternative treatment in accordance with all compliance requirements that the State determines to be necessary to achieve at least 4-log treatment of viruses.
- (c) **Discontinuing treatment.** A ground water system may discontinue 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source if the State determines and documents in writing that 4-log treatment of viruses is no longer necessary for that ground water source. A system that discontinues 4-log treatment of viruses is subject to the source water monitoring and analytical methods requirements of § 141.402 of this subpart.
- (d) Failure to meet the monitoring requirements of paragraph (b) of this section is a monitoring violation and requires the ground water system to provide public notification under § 141.204.

#### § 141.404 Treatment technique violations for ground water systems.

- (a) A ground water system with a significant deficiency is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the State) of receiving written notice from the State of the significant deficiency, the system:
  - (1) Does not complete corrective action in accordance with any applicable State plan review processes or other State guidance and direction, including State specified interim actions and measures, or
  - (2) Is not in compliance with a State-approved corrective action plan and schedule.
- (b) Unless the State invalidates a fecal indicator-positive ground water source sample under § 141.402(d), a ground water system is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the State) of meeting the conditions of § 141.403(a)(1) or § 141.403(a)(2), the system:
  - (1) Does not complete corrective action in accordance with any applicable State plan review processes or other State guidance and direction, including State-specified interim measures, or
  - (2) Is not in compliance with a State-approved corrective action plan and schedule.
- (c) A ground water system subject to the requirements of § 141.403(b)(3) that fails to maintain at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source is in violation of the treatment technique requirement if the failure is not corrected within four hours of determining the system is not maintaining at least 4-log treatment of viruses before or at the first customer.
- (d) Ground water system must give public notification under § 141.203 for the treatment technique violations specified in paragraphs (a), (b) and (c) of this section.

#### § 141.405 Reporting and recordkeeping for ground water systems.

- (a) **Reporting.** In addition to the requirements of § 141.31, a ground water system regulated under this subpart must provide the following information to the State:
  - (1) A ground water system conducting compliance monitoring under § 141.403(b) must notify the State any time the system fails to meet any State-specified requirements including, but not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within four hours. The ground water system must notify the State as soon as possible, but in no case later than the end of the next business day.

- (2) After completing any corrective action under § 141.403(a), a ground water system must notify the State within 30 days of completion of the corrective action.
- (3) If a ground water system subject to the requirements of § 141.402(a) does not conduct source water monitoring under § 141.402(a)(5)(ii), the system must provide documentation to the State within 30 days of the total coliform positive sample that it met the State criteria.
- (b) **Recordkeeping.** In addition to the requirements of § 141.33, a ground water system regulated under this subpart must maintain the following information in its records:
  - (1) Documentation of corrective actions. Documentation shall be kept for a period of not less than ten years.
  - (2) Documentation of notice to the public as required under § 141.403(a)(7). Documentation shall be kept for a period of not less than three years.
  - (3) Records of decisions under § 141.402(a)(5)(ii) and records of invalidation of fecal indicator-positive ground water source samples under § 141.402(d). Documentation shall be kept for a period of not less than five years.
  - (4) For consecutive systems, documentation of notification to the wholesale system(s) of total coliform-positive samples that are not invalidated under § 141.21(c) until March 31, 2016, or under § 141.853 beginning April 1, 2016. Documentation shall be kept for a period of not less than five years.
  - (5) For systems, including wholesale systems, that are required to perform compliance monitoring under § 141.403(b):
    - (i) Records of the State-specified minimum disinfectant residual. Documentation shall be kept for a period of not less than ten years.
    - (ii) Records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the State-prescribed minimum residual disinfectant concentration for a period of more than four hours. Documentation shall be kept for a period of not less than five years.
    - (iii) Records of State-specified compliance requirements for membrane filtration and of parameters specified by the State for State-approved alternative treatment and records of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four hours. Documentation shall be kept for a period of not less than five years.

[71 FR 65653, Nov. 8, 2006, as amended at 78 FR 10353, Feb. 13, 2013]

## Subpart T—Enhanced Filtration and Disinfection—Systems Serving Fewer Than 10,000 People

**Source:** 67 FR 1839, Jan. 14, 2002, unless otherwise noted.

### GENERAL REQUIREMENTS

## § 141.500 General requirements.

The requirements of this subpart constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: *Giardia lamblia*, viruses, heterotrophic plate count bacteria, *Legionella*, *Cryptosporidium* and turbidity. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

- (a) At least 99 percent (2 log) removal of *Cryptosporidium* between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or *Cryptosporidium* control under the watershed control plan for unfiltered systems; and
- (b) Compliance with the profiling and benchmark requirements in §§ 141.530 through 141.544.

## § 141.501 Who is subject to the requirements of subpart T?

You are subject to these requirements if your system:

- (a) Is a public water system;
- (b) Uses surface water or GWUDI as a source; and
- (c) Serves fewer than 10,000 persons.

## § 141.502 When must my system comply with these requirements?

You must comply with these requirements in this subpart beginning January 1, 2005, except where otherwise noted.

[69 FR 38856, June 29, 2004]

## § 141.503 What does subpart T require?

There are seven requirements of this subpart, and you must comply with all requirements that are applicable to your system. These requirements are:

- (a) You must cover any finished water reservoir that you began to construct on or after March 15, 2002 as described in §§ 141.510 and 141.511;
- (b) If your system is an unfiltered system, you must comply with the updated watershed control requirements described in §§ 141.520-141.522;
- (c) If your system is a community or non-transient non-community water systems you must develop a disinfection profile as described in §§ 141.530-141.536;
- (d) If your system is considering making a significant change to its disinfection practices, you must develop a disinfection benchmark and consult with the State for approval of the change as described in §§ 141.540-141.544;
- (e) If your system is a filtered system, you must comply with the combined filter effluent requirements as described in §§ 141.550-141.553;
- (f) If your system is a filtered system that uses conventional or direct filtration, you must comply with the individual filter turbidity requirements as described in §§ 141.560-141.564; and

- (g) You must comply with the applicable reporting and recordkeeping requirements as described in §§ 141.570 and 141.571.

#### FINISHED WATER RESERVOIRS

### § 141.510 Is my system subject to the new finished water reservoir requirements?

All subpart H systems which serve fewer than 10,000 are subject to this requirement.

### § 141.511 What is required of new finished water reservoirs?

If your system begins construction of a finished water reservoir on or after March 15, 2002 the reservoir must be covered. Finished water reservoirs for which your system began construction prior to March 15, 2002 are not subject to this requirement.

#### ADDITIONAL WATERSHED CONTROL REQUIREMENTS FOR UNFILTERED SYSTEMS

### § 141.520 Is my system subject to the updated watershed control requirements?

If you are a subpart H system serving fewer than 10,000 persons which does not provide filtration, you must continue to comply with all of the filtration avoidance criteria in § 141.71, as well as the additional watershed control requirements in § 141.521.

### § 141.521 What updated watershed control requirements must my unfiltered system implement to continue to avoid filtration?

Your system must take any additional steps necessary to minimize the potential for contamination by *Cryptosporidium* oocysts in the source water. Your system's watershed control program must, for *Cryptosporidium*:

- (a) Identify watershed characteristics and activities which may have an adverse effect on source water quality; and
- (b) Monitor the occurrence of activities which may have an adverse effect on source water quality.

### § 141.522 How does the State determine whether my system's watershed control requirements are adequate?

During an onsite inspection conducted under the provisions of § 141.71(b)(3), the State must determine whether your watershed control program is adequate to limit potential contamination by *Cryptosporidium* oocysts. The adequacy of the program must be based on the comprehensiveness of the watershed review; the effectiveness of your program to monitor and control detrimental activities occurring in the watershed; and the extent to which your system has maximized land ownership and/or controlled land use within the watershed.

#### DISINFECTION PROFILE

### § 141.530 What is a disinfection profile and who must develop one?

A disinfection profile is a graphical representation of your system's level of *Giardia lamblia* or virus inactivation measured during the course of a year. If you are a subpart H community or non-transient non-community water system which serves fewer than 10,000 persons, your system must develop a disinfection profile unless your State determines that your system's profile is unnecessary. Your State may approve the use of a more representative data set for disinfection profiling than the data set required under §§ 141.532-141.536.

[67 FR 1839, Jan. 14, 2002, as amended at 69 FR 38856, June 29, 2004]

### § 141.531 What criteria must a State use to determine that a profile is unnecessary?

States may only determine that a system's profile is unnecessary if a system's TTHM and HAA5 levels are below 0.064 mg/L and 0.048 mg/L, respectively. To determine these levels, TTHM and HAA5 samples must be collected after January 1, 1998, during the month with the warmest water temperature, and at the point of maximum residence time in your distribution system. Your State may approve a more representative TTHM and HAA5 data set to determine these levels.

[67 FR 1839, Jan. 14, 2002, as amended at 69 FR 38856, June 29, 2004]

### § 141.532 How does my system develop a disinfection profile and when must it begin?

A disinfection profile consists of three steps:

- (a) First, your system must collect data for several parameters from the plant as discussed in § 141.533 over the course of 12 months. If your system serves between 500 and 9,999 persons you must begin to collect data no later than July 1, 2003. If your system serves fewer than 500 persons you must begin to collect data no later than January 1, 2004.
- (b) Second, your system must use this data to calculate weekly log inactivation as discussed in §§ 141.534 and 141.535; and
- (c) Third, your system must use these weekly log inactivations to develop a disinfection profile as specified in § 141.536.

### § 141.533 What data must my system collect to calculate a disinfection profile?

Your system must monitor the following parameters to determine the total log inactivation using the analytical methods in § 141.74 (a), once per week on the same calendar day, over 12 consecutive months:

- (a) The temperature of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;
- (b) If your system uses chlorine, the pH of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;
- (c) The disinfectant contact time(s) ("T") during peak hourly flow; and
- (d) The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection during peak hourly flow.

§ 141.534 How does my system use this data to calculate an inactivation ratio?

Use the tables in § 141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of *Giardia lamblia*:

If your system * * *	Your system must determine * * *
(a) Uses only one point of disinfectant application	(1) One inactivation ratio (CTcalc/CT99.9) before or at the first customer during peak hourly flow or  (2) Successive CTcalc/CT99.9 values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, your system must calculate the total inactivation ratio by determining (CTcalc/CT99.9) for each sequence and then adding the (CTcalc/CT99.9) values together to determine (ΣCTcalc/CT99.9).
(b) Uses more than one point of disinfectant application before the first customer	The (CTcalc/CT99.9) value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow using the procedure specified in paragraph (a)(2) of this section.

[67 FR 1839, Jan. 14, 2002, as amended at 69 FR 38856, June 29, 2004]

§ 141.535 What if my system uses chloramines, ozone, or chlorine dioxide for primary disinfection?

If your system uses chloramines, ozone, or chlorine dioxide for primary disinfection, you must also calculate the logs of inactivation for viruses and develop an additional disinfection profile for viruses using methods approved by the State.

§ 141.536 My system has developed an inactivation ratio; what must we do now?

Each log inactivation serves as a data point in your disinfection profile. Your system will have obtained 52 measurements (one for every week of the year). This will allow your system and the State the opportunity to evaluate how microbial inactivation varied over the course of the year by looking at all 52 measurements (your Disinfection Profile). Your system must retain the Disinfection Profile data in graphic form, such as a spreadsheet, which must be available for review by the State as part of a sanitary survey. Your system must use this data to calculate a benchmark if you are considering changes to disinfection practices.

DISINFECTION BENCHMARK



### § 141.540 Who has to develop a disinfection benchmark?

If you are a subpart H system required to develop a disinfection profile under §§ 141.530 through 141.536, your system must develop a Disinfection Benchmark if you decide to make a significant change to your disinfection practice. Your system must consult with the State for approval before you can implement a significant disinfection practice change.

### § 141.541 What are significant changes to disinfection practice?

Significant changes to disinfection practice include:

- (a) Changes to the point of disinfection;
- (b) Changes to the disinfectant(s) used in the treatment plant;
- (c) Changes to the disinfection process; or
- (d) Any other modification identified by the State.

### § 141.542 What must my system do if we are considering a significant change to disinfection practices?

If your system is considering a significant change to its disinfection practice, your system must calculate a disinfection benchmark(s) as described in §§ 141.543 and 141.544 and provide the benchmark(s) to your State. Your system may only make a significant disinfection practice change after consulting with the State for approval. Your system must submit the following information to the State as part of the consultation and approval process:

- (a) A description of the proposed change;
- (b) The disinfection profile for *Giardia lamblia* (and, if necessary, viruses) and disinfection benchmark;
- (c) An analysis of how the proposed change will affect the current levels of disinfection; and
- (d) Any additional information requested by the State.

### § 141.543 How is the disinfection benchmark calculated?

If your system is making a significant change to its disinfection practice, it must calculate a disinfection benchmark using the procedure specified in the following table.

To calculate a disinfection benchmark your system must perform the following steps
Step 1: Using the data your system collected to develop the Disinfection Profile, determine the average <i>Giardia lamblia</i> inactivation for each calendar month by dividing the sum of all <i>Giardia lamblia</i> inactivations for that month by the number of values calculated for that month.
Step 2: Determine the lowest monthly average value out of the twelve values. This value becomes the disinfection benchmark.

§ 141.544 What if my system uses chloramines, ozone, or chlorine dioxide for primary disinfection?

If your system uses chloramines, ozone or chlorine dioxide for primary disinfection your system must calculate the disinfection benchmark from the data your system collected for viruses to develop the disinfection profile in addition to the *Giardia lamblia* disinfection benchmark calculated under § 141.543. This viral benchmark must be calculated in the same manner used to calculate the *Giardia lamblia* disinfection benchmark in § 141.543.

COMBINED FILTER EFFLUENT REQUIREMENTS

§ 141.550 Is my system required to meet subpart T combined filter effluent turbidity limits?

All subpart H systems which serve populations fewer than 10,000, are required to filter, and utilize filtration other than slow sand filtration or diatomaceous earth filtration must meet the combined filter effluent turbidity requirements of §§ 141.551-141.553 . If your system uses slow sand or diatomaceous earth filtration you are not required to meet the combined filter effluent turbidity limits of subpart T, but you must continue to meet the combined filter effluent turbidity limits in § 141.73.

§ 141.551 What strengthened combined filter effluent turbidity limits must my system meet?

Your system must meet two strengthened combined filter effluent turbidity limits.

- (a) The first combined filter effluent turbidity limit is a “95th percentile” turbidity limit that your system must meet in at least 95 percent of the turbidity measurements taken each month. Measurements must continue to be taken as described in § 141.74(a) and (c). Monthly reporting must be completed according to § 141.570. The following table describes the required limits for specific filtration technologies.

If your system consists of * * *	Your 95th percentile turbidity value is * * *
(1) Conventional Filtration or Direct Filtration	0.3 NTU.
(2) All other “Alternative”	A value determined by the State (not to exceed 1 NTU) based on the

If your system consists of * * *	Your 95th percentile turbidity value is * * *
Filtration	demonstration described in § 141.552.

- (b) The second combined filter effluent turbidity limit is a “maximum” turbidity limit which your system may at no time exceed during the month. Measurements must continue to be taken as described in § 141.74(a) and (c). Monthly reporting must be completed according to § 141.570. The following table describes the required limits for specific filtration technologies.

If your system consists of * * *	Your maximum turbidity value is * * *
(1) Conventional Filtration or Direct Filtration	1 NTU.
(2) All other “Alternative Filtration”	A value determined by the State (not to exceed 5 NTU) based on the demonstration as described in § 141.552.

[67 FR 1839, Jan. 14, 2002, as amended at 69 FR 38856, June 29, 2004]

### § 141.552 My system consists of “alternative filtration” and is required to conduct a demonstration—what is required of my system and how does the State establish my turbidity limits?

- (a) If your system consists of alternative filtration (filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) you are required to conduct a demonstration (see tables in § 141.551). Your system must demonstrate to the State, using pilot plant studies or other means, that your system’s filtration, in combination with disinfection treatment, consistently achieves:

- (1) 99 percent removal of *Cryptosporidium* oocysts;
- (2) 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts; and
- (3) 99.99 percent removal and/or inactivation of viruses.

- (b) [Reserved]

### § 141.553 My system practices lime softening—is there any special provision regarding my combined filter effluent?

If your system practices lime softening, you may acidify representative combined filter effluent turbidity samples prior to analysis using a protocol approved by the State.

#### INDIVIDUAL FILTER TURBIDITY REQUIREMENTS

§ 141.560 Is my system subject to individual filter turbidity requirements?

If your system is a subpart H system serving fewer than 10,000 people and utilizing conventional filtration or direct filtration, you must conduct continuous monitoring of turbidity for each individual filter at your system. The following requirements apply to continuous turbidity monitoring:

- (a) Monitoring must be conducted using an approved method in § 141.74(a);
- (b) Calibration of turbidimeters must be conducted using procedures specified by the manufacturer;
- (c) Results of turbidity monitoring must be recorded at least every 15 minutes;
- (d) Monthly reporting must be completed according to § 141.570; and
- (e) Records must be maintained according to § 141.571.

§ 141.561 What happens if my system's turbidity monitoring equipment fails?

If there is a failure in the continuous turbidity monitoring equipment, your system must conduct grab sampling every four hours in lieu of continuous monitoring until the turbidimeter is back on-line. Your system has 14 days to resume continuous monitoring before a violation is incurred.

§ 141.562 My system only has two or fewer filters—is there any special provision regarding individual filter turbidity monitoring?

Yes, if your system only consists of two or fewer filters, you may conduct continuous monitoring of combined filter effluent turbidity in lieu of individual filter effluent turbidity monitoring. Continuous monitoring must meet the same requirements set forth in § 141.560(a) through (d) and § 141.561.

§ 141.563 What follow-up action is my system required to take based on continuous turbidity monitoring?

Follow-up action is required according to the following tables:

If * * *	Your system must * * *
(a) The turbidity of an individual filter (or the turbidity of combined filter effluent (CFE) for systems with 2 filters that monitor CFE in lieu of individual filters) exceeds 1.0 NTU in two	Report to the State by the 10th of the following month and include the filter number(s), corresponding date(s), turbidity value(s) which exceeded 1.0 NTU, and the

If * * *	Your system must * * *
consecutive recordings 15 minutes apart	cause (if known) for the exceedance(s).

If a system was required to report to the State * * *	Your system must * * *
(b) For three months in a row and turbidity exceeded 1.0 NTU in two consecutive recordings 15 minutes apart at the same filter (or CFE for systems with 2 filters that monitor CFE in lieu of individual filters)	Conduct a self-assessment of the filter(s) within 14 days of the day the filter exceeded 1.0 NTU in two consecutive measurements for the third straight month unless a CPE as specified in paragraph (c) of this section was required. Systems with 2 filters that monitor CFE in lieu of individual filters must conduct a self assessment on both filters. The self-assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.
(c) For two months in a row and turbidity exceeded 2.0 NTU in 2 consecutive recordings 15 minutes apart at the same filter (or CFE for systems with 2 filters that monitor CFE in lieu of individual filters)	Arrange to have a comprehensive performance evaluation (CPE) conducted by the State or a third party approved by the State not later than 60 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month. If a CPE has been completed by the State or a third party approved by the State within the 12 prior months or the system and State are jointly participating in an ongoing Comprehensive Technical Assistance (CTA) project at the system, a new CPE is not required. If conducted, a CPE must be completed and submitted to the State no later than 120 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month.

[67 FR 1839, Jan. 14, 2002, as amended at 69 FR 38856, June 29, 2004]

### § 141.564 My system practices lime softening—is there any special provision regarding my individual filter turbidity monitoring?

If your system utilizes lime softening, you may apply to the State for alternative turbidity exceedance levels for the levels specified in the table in § 141.563. You must be able to demonstrate to the State that higher turbidity levels are due to lime carryover only, and not due to degraded filter performance.

#### REPORTING AND RECORDKEEPING REQUIREMENTS

## § 141.570 What does subpart T require that my system report to the State?

This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.

Corresponding requirement	Description of information to report	Frequency
(a) Combined Filter Effluent Requirements (§§ 141.550-141.553)	(1) The total number of filtered water turbidity measurements taken during the month	By the 10th of the following month.
	(2) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to your system's required 95th percentile limit	By the 10th of the following month.
	(3) The date and value of any turbidity measurements taken during the month which exceed the maximum turbidity value for your filtration system	By the 10th of the following month.
(b) Individual Turbidity Requirements (§§ 141.560-141.564)	(1) That your system conducted individual filter turbidity monitoring during the month	By the 10th of the following month.
	(2) The filter number(s), corresponding date(s), and the turbidity value(s) which exceeded 1.0 NTU during the month, and the cause (if known) for the exceedance(s), but only if 2 consecutive measurements exceeded 1.0 NTU	By the 10th of the following month.
	(3) If a self-assessment is required, the date that it was triggered and the date that it was completed	By the 10th of the following month (or 14 days after the self-assessment was triggered only if the self-assessment was triggered during the last four days of the month)
	(4) If a CPE is required, that the CPE is required and the date that it was triggered	By the 10th of the following month.
	(5) Copy of completed CPE report	Within 120 days after the CPE was triggered.
(c) Disinfection Profiling (§§	(1) Results of optional monitoring which show TTHM levels <0.064 mg/l and HAA5 levels <0.048 mg/l (Only if your system wishes to	(i) For systems serving 500-9,999 by July 1, 2003; (ii) For systems serving fewer

Corresponding requirement	Description of information to report	Frequency
141.530-141.536)	forgo profiling) or that your system has begun disinfection profiling	than 500 by January 1, 2004.
(d) Disinfection Benchmarking (§§ 141.540-141.544)	(1) A description of the proposed change in disinfection, your system's disinfection profile for <i>Giardia lamblia</i> (and, if necessary, viruses) and disinfection benchmark, and an analysis of how the proposed change will affect the current levels of disinfection	Anytime your system is considering a significant change to its disinfection practice.

[67 FR 1839, Jan. 14, 2002, as amended at 69 FR 38857, June 29, 2004]

### § 141.571 What records does subpart T require my system to keep?

Your system must keep several types of records based on the requirements of subpart T, in addition to recordkeeping requirements under § 141.75. The following table describes the necessary records, the length of time these records must be kept, and for which requirement the records pertain. Your system is required to maintain records described in this table, if it is subject to the specific requirement shown in the first column.

Corresponding requirement	Description of necessary records	Duration of time records must be kept
(a) Individual Filter Turbidity Requirements (§§ 141.560-141.564)	Results of individual filter monitoring	At least 3 years.
(b) Disinfection Profiling (§§ 141.530-141.536)	Results of Profile (including raw data and analysis)	Indefinitely.
(c) Disinfection Benchmarking (§§ 141.540-141.544)	Benchmark (including raw data and analysis)	Indefinitely.

## Subpart U—Initial Distribution System Evaluations

**Source:** 71 FR 483, Jan. 4, 2006, unless otherwise noted.

### § 141.600 General requirements.

- (a) The requirements of subpart U of this part constitute national primary drinking water regulations. The regulations in this subpart establish monitoring and other requirements for identifying subpart V compliance monitoring locations for determining compliance with maximum contaminant levels for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5). You must use an Initial Distribution System

Evaluation (IDSE) to determine locations with representative high TTHM and HAA5 concentrations throughout your distribution system. IDSEs are used in conjunction with, but separate from, subpart L compliance monitoring, to identify and select subpart V compliance monitoring locations.

- (b) **Applicability.** You are subject to these requirements if your system is a community water system that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light; or if your system is a nontransient noncommunity water system that serves at least 10,000 people and uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

(c) **Schedule.**

- (1) You must comply with the requirements of this subpart on the schedule in the table in this paragraph (c)(1).

If you serve this population	You must submit your standard monitoring plan or system specific study plan <sup>1</sup> or 40/30 certification <sup>2</sup> to the State by or receive very small system waiver from State	You must complete your standard monitoring or system specific study by	You must submit your IDSE report to the State by <sup>3</sup>
SYSTEMS THAT ARE NOT PART OF A COMBINED DISTRIBUTION SYSTEM AND SYSTEMS THAT SERVE THE LARGEST POPULATION IN THE COMBINED DISTRIBUTION SYSTEM			
(i) ≥100,000	October 1, 2006	September 30, 2008	January 1, 2009.
(ii) 50,000-99,999	April 1, 2007	March 31, 2009	July 1, 2009.
(iii) 10,000-49,999	October 1, 2007	September 30, 2009	January 1, 2010.
(iv) <10,000 (CWS Only)	April 1, 2008	March 31, 2010	July 1, 2010.
OTHER SYSTEMS THAT ARE PART OF A COMBINED DISTRIBUTION SYSTEM			
(v) Wholesale system or consecutive system	—at the same time as the system with the earliest compliance date in the combined distribution system	—at the same time as the system with the earliest compliance date in the combined	—at the same time as the system with the earliest compliance date in the combined

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

<sup>2</sup> You must submit your 40/30 certification under § 141.603 by the date indicated.

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



If you serve this population	You must submit your standard monitoring plan or system specific study plan <sup>1</sup> or 40/30 certification <sup>2</sup> to the State by or receive very small system waiver from State	You must complete your standard monitoring or system specific study by	You must submit your IDSE report to the State by <sup>3</sup>
		distribution system	distribution system.

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

<sup>2</sup> You must submit your 40/30 certification under § 141.603 by the date indicated.

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

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

(d) You must conduct standard monitoring that meets the requirements in § 141.601, or a system specific study that meets the requirements in § 141.602, or certify to the State that you meet 40/30 certification criteria under § 141.603, or qualify for a very small system waiver under § 141.604.

(1) You must have taken the full complement of routine TTHM and HAA5 compliance samples required of a system with your population and source water under subpart L of this part (or you must have taken the full complement of reduced TTHM and HAA5 compliance samples required of a system with your population and source water under subpart L if you meet reduced monitoring criteria under subpart L of this part) during the period specified in § 141.603(a) to meet the 40/30 certification criteria in § 141.603. You must have taken TTHM and HAA5 samples under §§ 141.131 and 141.132 to be eligible for the very small system waiver in § 141.604.

(2) If you have not taken the required samples, you must conduct standard monitoring that meets the requirements in § 141.601, or a system specific study that meets the requirements in § 141.602.

(e) You must use only the analytical methods specified in § 141.131, or otherwise approved by EPA for monitoring under this subpart, to demonstrate compliance with the requirements of this subpart.

(f) IDSE results will not be used for the purpose of determining compliance with MCLs in § 141.64.

## § 141.601 Standard monitoring.

- (a) **Standard monitoring plan.** Your standard monitoring plan must comply with paragraphs (a)(1) through (a)(4) of this section. You must prepare and submit your standard monitoring plan to the State according to the schedule in § 141.600(c).
  - (1) Your standard monitoring plan must include a schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating locations and dates of all projected standard monitoring, and all projected subpart L compliance monitoring.
  - (2) Your standard monitoring plan must include justification of standard monitoring location selection and a summary of data you relied on to justify standard monitoring location selection.
  - (3) Your standard monitoring plan must specify the population served and system type (subpart H or ground water).
  - (4) You must retain a complete copy of your standard monitoring plan submitted under this paragraph (a), including any State modification of your standard monitoring plan, for as long as you are required to retain your IDSE report under paragraph (c)(4) of this section.
- (b) **Standard monitoring.**
  - (1) You must monitor as indicated in the table in this paragraph (b)(1). You must collect dual sample sets at each monitoring location. One sample in the dual sample set must be analyzed for TTHM. The other sample in the dual sample set must be analyzed for HAA5. You must conduct one monitoring period during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature. You must review available compliance, study, or operational data to determine the peak historical month for TTHM or HAA5 levels or warmest water temperature.

Source water type	Population size category	Monitoring periods and frequency of sampling	Distribution system monitoring locations <sup>1</sup>				
			Total per monitoring period	Near entry points	Average residence time	High TTHM locations	High HAA5 locations
Subpart H	<500 consecutive systems	one (during peak historical month) <sup>2</sup>	2	1		1	
	<500 non-consecutive systems		2			1	1
	500-3,300 consecutive systems	four (every 90 days)	2	1		1	
	500-3,300 non-consecutive systems		2			1	1
	3,301-9,999		4		1	2	1
	10,000-49,999	six (every 60 days)	8	1	2	3	2
	50,000-249,999		16	3	4	5	4
	250,000-999,999		24	4	6	8	6
	1,000,000-4,999,999		32	6	8	10	8
	≥5,000,000		40	8	10	12	10
Ground Water	<500 consecutive systems	one (during peak historical month) <sup>2</sup>	2	1		1	
	<500 non-consecutive systems		2			1	1
	500-9,999	four (every 90 days)	2			1	1
	10,000-99,999		6	1	1	2	2
	100,000-499,999		8	1	1	3	3
	≥500,000		12	2	2	4	4

<sup>1</sup> A dual sample set (i.e., a TTHM and an HAA5 sample) must be taken at each monitoring location during each monitoring period.

<sup>2</sup> The peak historical month is the month with the highest TTHM or HAA5 levels or the warmest water temperature.

- (2) You must take samples at locations other than the existing subpart L monitoring locations. Monitoring locations must be distributed throughout the distribution system.
  - (3) If the number of entry points to the distribution system is fewer than the specified number of entry point monitoring locations, excess entry point samples must be replaced equally at high TTHM and HAA5 locations. If there is an odd extra location number, you must take a sample at a high TTHM location. If the number of entry points to the distribution system is more than the specified number of entry point monitoring locations, you must take samples at entry points to the distribution system having the highest annual water flows.
  - (4) Your monitoring under this paragraph (b) may not be reduced under the provisions of § 141.29 and the State may not reduce your monitoring using the provisions of § 142.16(m).
- (c) **IDSE report.** Your IDSE report must include the elements required in paragraphs (c)(1) through (c)(4) of this section. You must submit your IDSE report to the State according to the schedule in § 141.600(c).
- (1) Your IDSE report must include all TTHM and HAA5 analytical results from subpart L compliance monitoring and all standard monitoring conducted during the period of the IDSE as individual analytical results and LRAAs presented in a tabular or spreadsheet format acceptable to the State. If changed from your standard monitoring plan submitted under paragraph (a) of this section, your report must also include a schematic of your distribution system, the population served, and system type (subpart H or ground water).
  - (2) Your IDSE report must include an explanation of any deviations from your approved standard monitoring plan.
  - (3) You must recommend and justify subpart V compliance monitoring locations and timing based on the protocol in § 141.605.
  - (4) You must retain a complete copy of your IDSE report submitted under this section for 10 years after the date that you submitted your report. If the State modifies the subpart V monitoring requirements that you recommended in your IDSE report or if the State approves alternative monitoring locations, you must keep a copy of the State's notification on file for 10 years after the date of the State's notification. You must make the IDSE report and any State notification available for review by the State or the public.

### § 141.602 System specific studies.

- (a) **System specific study plan.** Your system specific study plan must be based on either existing monitoring results as required under paragraph (a)(1) of this section or modeling as required under paragraph (a)(2) of this section. You must prepare and submit your system specific study plan to the State according to the schedule in § 141.600(c).
  - (1) **Existing monitoring results.** You may comply by submitting monitoring results collected before you are required to begin monitoring under § 141.600(c). The monitoring results and analysis must meet the criteria in paragraphs (a)(1)(i) and (a)(1)(ii) of this section.
    - (i) **Minimum requirements.**
      - (A) TTHM and HAA5 results must be based on samples collected and analyzed in accordance with § 141.131. Samples must be collected no earlier than five years prior to the study plan submission date.

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

System Type	Population size category	Number of monitoring locations	Number of samples	
			TTHM	HAA5
Subpart H:	<500	3	3	3
	500-3,300	3	9	9
	3,301-9,999	6	36	36
	10,000-49,999	12	72	72
	50,000-249,999	24	144	144
	250,000-999,999	36	216	216
	1,000,000-4,999,999	48	288	288
	≥5,000,000	60	360	360
Ground Water:	<500	3	3	3
	500-9,999	3	9	9
	10,000-99,999	12	48	48
	100,000-499,999	18	72	72
	≥500,000	24	96	96

(ii) **Reporting monitoring results.** You must report the information in this paragraph (a)(1)(ii).

- (A) You must report previously collected monitoring results and certify that the reported monitoring results include all compliance and non-compliance results generated during the time period beginning with the first reported result and ending with the most recent subpart L results.
- (B) You must certify that the samples were representative of the entire distribution system and that treatment, and distribution system have not changed significantly since the samples were collected.
- (C) Your study monitoring plan must include a schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed or planned system specific study monitoring.
- (D) Your system specific study plan must specify the population served and system type (subpart H or ground water).

- (E) You must retain a complete copy of your system specific study plan submitted under this paragraph (a)(1), including any State modification of your system specific study plan, for as long as you are required to retain your IDSE report under paragraph (b)(5) of this section.
  - (F) If you submit previously collected data that fully meet the number of samples required under paragraph (a)(1)(i)(B) of this section and the State rejects some of the data, you must either conduct additional monitoring to replace rejected data on a schedule the State approves or conduct standard monitoring under § 141.601.
- (2) **Modeling.** You may comply through analysis of an extended period simulation hydraulic model. The extended period simulation hydraulic model and analysis must meet the criteria in this paragraph (a)(2).
- (i) **Minimum requirements.**
    - (A) The model must simulate 24 hour variation in demand and show a consistently repeating 24 hour pattern of residence time.
    - (B) The model must represent the criteria listed in paragraphs (a)(2)(i)(B)(1) through (9) of this section.
      - (1) 75% of pipe volume;
      - (2) 50% of pipe length;
      - (3) All pressure zones;
      - (4) All 12-inch diameter and larger pipes;
      - (5) All 8-inch and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps, and control valves, or are known or expected to be significant conveyors of water;
      - (6) All 6-inch and larger pipes that connect remote areas of a distribution system to the main portion of the system;
      - (7) All storage facilities with standard operations represented in the model; and
      - (8) All active pump stations with controls represented in the model; and
      - (9) All active control valves.
    - (C) The model must be calibrated, or have calibration plans, for the current configuration of the distribution system during the period of high TTHM formation potential. All storage facilities must be evaluated as part of the calibration process. All required calibration must be completed no later than 12 months after plan submission.
  - (ii) **Reporting modeling.** Your system specific study plan must include the information in this paragraph (a)(2)(ii).
    - (A) Tabular or spreadsheet data demonstrating that the model meets requirements in paragraph (a)(2)(i)(B) of this section.

- (B) A description of all calibration activities undertaken, and if calibration is complete, a graph of predicted tank levels versus measured tank levels for the storage facility with the highest residence time in each pressure zone, and a time series graph of the residence time at the longest residence time storage facility in the distribution system showing the predictions for the entire simulation period (*i.e.*, from time zero until the time it takes to for the model to reach a consistently repeating pattern of residence time).
  - (C) Model output showing preliminary 24 hour average residence time predictions throughout the distribution system.
  - (D) Timing and number of samples representative of the distribution system planned for at least one monitoring period of TTHM and HAA5 dual sample monitoring at a number of locations no less than would be required for the system under standard monitoring in § 141.601 during the historical month of high TTHM. These samples must be taken at locations other than existing subpart L compliance monitoring locations.
  - (E) Description of how all requirements will be completed no later than 12 months after you submit your system specific study plan.
  - (F) Schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed system specific study monitoring (if calibration is complete) and all subpart L compliance monitoring.
  - (G) Population served and system type (subpart H or ground water).
  - (H) You must retain a complete copy of your system specific study plan submitted under this paragraph (a)(2), including any State modification of your system specific study plan, for as long as you are required to retain your IDSE report under paragraph (b)(7) of this section.
- (iii) If you submit a model that does not fully meet the requirements under paragraph (a)(2) of this section, you must correct the deficiencies and respond to State inquiries concerning the model. If you fail to correct deficiencies or respond to inquiries to the State's satisfaction, you must conduct standard monitoring under § 141.601.
- (b) **IDSE report.** Your IDSE report must include the elements required in paragraphs (b)(1) through (b)(6) of this section. You must submit your IDSE report according to the schedule in § 141.600(c).
- (1) Your IDSE report must include all TTHM and HAA5 analytical results from subpart L compliance monitoring and all system specific study monitoring conducted during the period of the system specific study presented in a tabular or spreadsheet format acceptable to the State. If changed from your system specific study plan submitted under paragraph (a) of this section, your IDSE report must also include a schematic of your distribution system, the population served, and system type (subpart H or ground water).
  - (2) If you used the modeling provision under paragraph (a)(2) of this section, you must include final information for the elements described in paragraph (a)(2)(ii) of this section, and a 24-hour time series graph of residence time for each subpart V compliance monitoring location selected.
  - (3) You must recommend and justify subpart V compliance monitoring locations and timing based on the protocol in § 141.605.

- (4) Your IDSE report must include an explanation of any deviations from your approved system specific study plan.
- (5) Your IDSE report must include the basis (analytical and modeling results) and justification you used to select the recommended subpart V monitoring locations.
- (6) You may submit your IDSE report in lieu of your system specific study plan on the schedule identified in § 141.600(c) for submission of the system specific study plan if you believe that you have the necessary information by the time that the system specific study plan is due. If you elect this approach, your IDSE report must also include all information required under paragraph (a) of this section.
- (7) You must retain a complete copy of your IDSE report submitted under this section for 10 years after the date that you submitted your IDSE report. If the State modifies the subpart V monitoring requirements that you recommended in your IDSE report or if the State approves alternative monitoring locations, you must keep a copy of the State's notification on file for 10 years after the date of the State's notification. You must make the IDSE report and any State notification available for review by the State or the public.

§ 141.603 40/30 certification.

- (a) **Eligibility.** You are eligible for 40/30 certification if you had no TTHM or HAA5 monitoring violations under subpart L of this part and no individual sample exceeded 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 during an eight consecutive calendar quarter period beginning no earlier than the date specified in this paragraph (a).

If your 40/30 certification is due	Then your eligibility for 40/30 certification is based on eight consecutive calendar quarters of subpart L compliance monitoring results beginning no earlier than <sup>1</sup>
(1) October 1, 2006	January 2004.
(2) April 1, 2007	January 2004.
(3) October 1, 2007	January 2005.
(4) April 1, 2008	January 2005.

<sup>1</sup> Unless you are on reduced monitoring under subpart L of this part and were not required to monitor during the specified period. If you did not monitor during the specified period, you must base your eligibility on compliance samples taken during the 12 months preceding the specified period.

- (b) **40/30 certification.**
  - (1) You must certify to your State that every individual compliance sample taken under subpart L of this part during the periods specified in paragraph (a) of this section were ≤0.040 mg/L for TTHM and ≤0.030 mg/L for HAA5, and that you have not had any TTHM or HAA5 monitoring violations during the period specified in paragraph (a) of this section.



- (2) The State may require you to submit compliance monitoring results, distribution system schematics, and/or recommended subpart V compliance monitoring locations in addition to your certification. If you fail to submit the requested information, the State may require standard monitoring under § 141.601 or a system specific study under § 141.602.
- (3) The State may still require standard monitoring under § 141.601 or a system specific study under § 141.602 even if you meet the criteria in paragraph (a) of this section.
- (4) You must retain a complete copy of your certification submitted under this section for 10 years after the date that you submitted your certification. You must make the certification, all data upon which the certification is based, and any State notification available for review by the State or the public.

§ 141.604 Very small system waivers.

- (a) If you serve fewer than 500 people and you have taken TTHM and HAA5 samples under subpart L of this part, you are not required to comply with this subpart unless the State notifies you that you must conduct standard monitoring under § 141.601 or a system specific study under § 141.602.
- (b) If you have not taken TTHM and HAA5 samples under subpart L of this part or if the State notifies you that you must comply with this subpart, you must conduct standard monitoring under § 141.601 or a system specific study under § 141.602.

§ 141.605 Subpart V compliance monitoring location recommendations.

- (a) Your IDSE report must include your recommendations and justification for where and during what month(s) TTHM and HAA5 monitoring for subpart V of this part should be conducted. You must base your recommendations on the criteria in paragraphs (b) through (e) of this section.
- (b) You must select the number of monitoring locations specified in the table in this paragraph (b). You will use these recommended locations as subpart V routine compliance monitoring locations, unless State requires different or additional locations. You should distribute locations throughout the distribution system to the extent possible.

Source water type	Population size category	Monitoring frequency <sup>1</sup>	Distribution system monitoring location			
			Total per monitoring period <sup>2</sup>	Highest TTHM locations	Highest HAA5 locations	Existing subpart L compliance locations
Subpart H:						

<sup>1</sup> All systems must monitor during month of highest DBP concentrations.

<sup>2</sup> Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for subpart H systems serving 500-3,300. Ground water systems serving 500-9,999 on annual monitoring must take dual sample sets at each monitoring location. All other systems on annual monitoring and subpart H systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. For systems serving fewer than 500 people, only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location and month.

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

<sup>1</sup> All systems must monitor during month of highest DBP concentrations.

<sup>2</sup> Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for subpart H systems serving 500-3,300. Ground water systems serving 500-9,999 on annual monitoring must take dual sample sets at each monitoring location. All other systems on annual monitoring and subpart H systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. For systems serving fewer than 500 people, only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location and month.

- (c) You must recommend subpart V compliance monitoring locations based on standard monitoring results, system specific study results, and subpart L compliance monitoring results. You must follow the protocol in paragraphs (c)(1) through (c)(8) of this section. If required to monitor at more than eight locations, you must repeat the protocol as necessary. If you do not have existing subpart L compliance monitoring results or if you do not have enough existing subpart L compliance monitoring results, you must repeat the protocol, skipping the provisions of paragraphs (c)(3) and (c)(7) of this section as necessary, until you have identified the required total number of monitoring locations.
- (1) Location with the highest TTHM LRAA not previously selected as a subpart V monitoring location.
  - (2) Location with the highest HAA5 LRAA not previously selected as a subpart V monitoring location.
  - (3) Existing subpart L average residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water systems) with the highest HAA5 LRAA not previously selected as a subpart V monitoring location.

- (4) Location with the highest TTHM LRAA not previously selected as a subpart V monitoring location.
- (5) Location with the highest TTHM LRAA not previously selected as a subpart V monitoring location.
- (6) Location with the highest HAA5 LRAA not previously selected as a subpart V monitoring location.
- (7) Existing subpart L average residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water systems) with the highest TTHM LRAA not previously selected as a subpart V monitoring location.
- (8) Location with the highest HAA5 LRAA not previously selected as a subpart V monitoring location.
- (d) You may recommend locations other than those specified in paragraph (c) of this section if you include a rationale for selecting other locations. If the State approves the alternate locations, you must monitor at these locations to determine compliance under subpart V of this part.
- (e) Your recommended schedule must include subpart V monitoring during the peak historical month for TTHM and HAA5 concentration, unless the State approves another month. Once you have identified the peak historical month, and if you are required to conduct routine monitoring at least quarterly, you must schedule subpart V compliance monitoring at a regular frequency of every 90 days or fewer.

[71 FR 483, Jan. 4, 2006, as amended at 74 FR 30958, June 29, 2009]

## Subpart V—Stage 2 Disinfection Byproducts Requirements

**Source:** 71 FR 488, Jan. 4, 2006, unless otherwise noted.

### § 141.620 General requirements.

- (a) **General.** The requirements of subpart V of this part constitute national primary drinking water regulations. The regulations in this subpart establish monitoring and other requirements for achieving compliance with maximum contaminant levels based on locational running annual averages (LRAA) for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5), and for achieving compliance with maximum residual disinfectant residuals for chlorine and chloramine for certain consecutive systems.
- (b) **Applicability.** You are subject to these requirements if your system is a community water system or a nontransient noncommunity water system that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

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

If you are this type of system	You must comply with subpart V monitoring by: <sup>1</sup>
SYSTEMS THAT ARE NOT PART OF A COMBINED DISTRIBUTION SYSTEM AND SYSTEMS THAT SERVE THE LARGEST POPULATION IN THE COMBINED DISTRIBUTION SYSTEM	
(1) System serving ≥100,000	April 1, 2012.
(2) System serving 50,000-99,999	October 1, 2012.
(3) System serving 10,000-49,999	October 1, 2013.
(4) System serving <10,000	October 1, 2013 if no <i>Cryptosporidium</i> monitoring is required under § 141.701(a)(4) or October 1, 2014 if <i>Cryptosporidium</i> monitoring is required under § 141.701(a)(4) or (a)(6)
OTHER SYSTEMS THAT ARE PART OF A COMBINED DISTRIBUTION SYSTEM	
(5) Consecutive system or wholesale system	—at the same time as the system with the earliest compliance date in the combined distribution system.

<sup>1</sup> The State may grant up to an additional 24 months for compliance with MCLs and operational evaluation levels if you require capital improvements to comply with an MCL.

- (6) Your monitoring frequency is specified in § 141.621(a)(2).

- (i) If you are required to conduct quarterly monitoring, you must begin monitoring in the first full calendar quarter that includes the compliance date in the table in this paragraph (c).
- (ii) If you are required to conduct monitoring at a frequency that is less than quarterly, you must begin monitoring in the calendar month recommended in the IDSE report prepared under § 141.601 or § 141.602 or the calendar month identified in the subpart V monitoring plan developed under § 141.622 no later than 12 months after the compliance date in this table.

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

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

the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

(d) **Monitoring and compliance** —(1) *Systems required to monitor quarterly.* To comply with subpart V MCLs in § 141.64(b)(2), you must calculate LRAAs for TTHM and HAA5 using monitoring results collected under this subpart and determine that each LRAA does not exceed the MCL. If you fail to complete four consecutive quarters of monitoring, you must calculate compliance with the MCL based on the average of the available data from the most recent four quarters. If you take more than one sample per quarter at a monitoring location, you must average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

(2) *Systems required to monitor yearly or less frequently.* To determine compliance with subpart V MCLs in § 141.64(b)(2), you must determine that each sample taken is less than the MCL. If any sample exceeds the MCL, you must comply with the requirements of § 141.625. If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

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

[71 FR 488, Jan. 4, 2006; 71 FR 4645, Jan. 27, 2006]

## § 141.621 Routine monitoring.

(a) **Monitoring.**

(1) If you submitted an IDSE report, you must begin monitoring at the locations and months you have recommended in your IDSE report submitted under § 141.605 following the schedule in § 141.620(c), unless the State requires other locations or additional locations after its review. If you submitted a 40/30 certification under § 141.603 or you qualified for a very small system waiver under § 141.604 or you are a nontransient noncommunity water system serving <10,000, you must monitor at the location(s) and dates identified in your monitoring plan in § 141.132(f), updated as required by § 141.622.

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

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

<sup>1</sup> All systems must monitor during month of highest DBP concentrations.

<sup>2</sup> Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for subpart H systems serving 500-3,300. Ground water systems serving 500-9,999 on annual monitoring must take dual sample sets at each monitoring location. All other systems on annual monitoring and subpart H systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. For systems serving fewer than 500 people, only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location and month.

- (3) If you are an undisinfected system that begins using a disinfectant other than UV light after the dates in subpart U of this part for complying with the Initial Distribution System Evaluation requirements, you must consult with the State to identify compliance monitoring locations for this subpart. You must then develop a monitoring plan under § 141.622 that includes those monitoring locations.

- (b) **Analytical methods.** You must use an approved method listed in § 141.131 for TTHM and HAA5 analyses in this subpart. Analyses must be conducted by laboratories that have received certification by EPA or the State as specified in § 141.131.

[71 FR 488, Jan. 4, 2006, as amended at 74 FR 30958, June 29, 2009]

## § 141.622 Subpart V monitoring plan.

- (a)

- (1) You must develop and implement a monitoring plan to be kept on file for State and public review. The monitoring plan must contain the elements in paragraphs (a)(1)(i) through (a)(1)(iv) of this section and be complete no later than the date you conduct your initial monitoring under this subpart.
  - (i) Monitoring locations;
  - (ii) Monitoring dates;
  - (iii) Compliance calculation procedures; and
  - (iv) Monitoring plans for any other systems in the combined distribution system if the State has reduced monitoring requirements under the State authority in § 142.16(m).
- (2) If you were not required to submit an IDSE report under either § 141.601 or § 141.602, and you do not have sufficient subpart L monitoring locations to identify the required number of subpart V compliance monitoring locations indicated in § 141.605(b), you must identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of compliance monitoring locations have been identified. You must also provide the rationale for identifying the locations as having high levels of TTHM or HAA5. If you have more subpart L monitoring locations than required for subpart V compliance monitoring in § 141.605(b), you must identify which locations you will use for subpart V compliance monitoring by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of subpart V compliance monitoring locations have been identified.
- (b) If you are a subpart H system serving >3,300 people, you must submit a copy of your monitoring plan to the State prior to the date you conduct your initial monitoring under this subpart, unless your IDSE report submitted under subpart U of this part contains all the information required by this section.
- (c) You may revise your monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for State-approved reasons, after consultation with the State regarding the need for changes and the appropriateness of changes. If you change monitoring locations, you must replace existing compliance monitoring locations with the lowest LRAA with new locations that reflect the current distribution system locations with expected high TTHM or HAA5 levels. The State may also require modifications in your monitoring plan. If you are a subpart H system serving >3,300 people, you must submit a copy of your modified monitoring plan to the State prior to the date you are required to comply with the revised monitoring plan.

#### **§ 141.623 Reduced monitoring.**

- (a) You may reduce monitoring to the level specified in the table in this paragraph (a) any time the LRAA is  $\leq 0.040$  mg/L for TTHM and  $\leq 0.030$  mg/L for HAA5 at all monitoring locations. You may only use data collected under the provisions of this subpart or subpart L of this part to qualify for reduced monitoring.

In addition, the source water annual average TOC level, before any treatment, must be  $\leq 4.0$  mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either § 141.132(b)(1)(iii) or § 141.132(d).

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

<sup>1</sup> Systems on quarterly monitoring must take dual sample sets every 90 days.



Source water type	Population size category	Monitoring frequency <sup>1</sup>	Distribution system monitoring location per monitoring period
	10,000-99,999	per year	quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
	100,000-499,999	per quarter	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	≥500,000	per quarter	2 dual sample sets; at the locations with the highest TTHM and highest HAA5 LRAAs. 4 dual sample sets at the locations with the two highest TTHM and two highest HAA5 LRAAs.

<sup>1</sup> Systems on quarterly monitoring must take dual sample sets every 90 days.

- (b) You may remain on reduced monitoring as long as the TTHM LRAA  $\leq 0.040$  mg/L and the HAA5 LRAA  $\leq 0.030$  mg/L at each monitoring location (for systems with quarterly reduced monitoring) or each TTHM sample  $\leq 0.060$  mg/L and each HAA5 sample  $\leq 0.045$  mg/L (for systems with annual or less frequent monitoring). In addition, the source water annual average TOC level, before any treatment, must be  $\leq 4.0$  mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either § 141.132(b)(1)(iii) or § 141.132(d).
- (c) If the LRAA based on quarterly monitoring at any monitoring location exceeds either 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 or if the annual (or less frequent) sample at any location exceeds either 0.060 mg/L for TTHM or 0.045 mg/L for HAA5, or if the source water annual average TOC level, before any treatment,  $>4.0$  mg/L at any treatment plant treating surface water or ground water under the direct influence of surface water, you must resume routine monitoring under § 141.621 or begin increased monitoring if § 141.625 applies.
- (d) The State may return your system to routine monitoring at the State's discretion.

### § 141.624 Additional requirements for consecutive systems.

If you are a consecutive system that does not add a disinfectant but delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light, you must comply with analytical and monitoring requirements for chlorine and chloramines in § 141.131 (c) and § 141.132(c)(1) and the compliance requirements in § 141.133(c)(1) beginning April 1, 2009, unless required earlier by the State, and report monitoring results under § 141.134(c).

### § 141.625 Conditions requiring increased monitoring.

- (a) If you are required to monitor at a particular location annually or less frequently than annually under § 141.621 or § 141.623, you must increase monitoring to dual sample sets once per quarter (taken every 90 days) at all locations if a TTHM sample is  $>0.080$  mg/L or a HAA5 sample is  $>0.060$  mg/L at any location.

- (b) You are in violation of the MCL when the LRAA exceeds the subpart V MCLs in § 141.64(b)(2), calculated based on four consecutive quarters of monitoring (or the LRAA calculated based on fewer than four quarters of data if the MCL would be exceeded regardless of the monitoring results of subsequent quarters). You are in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if you fail to monitor.
- (c) You may return to routine monitoring once you have conducted increased monitoring for at least four consecutive quarters and the LRAA for every monitoring location is  $\leq 0.060$  mg/L for TTHM and  $\leq 0.045$  mg/L for HAA5.

#### § 141.626 Operational evaluation levels.

- (a) You have exceeded the operational evaluation level at any monitoring location where the sum of the two previous quarters' TTHM results plus twice the current quarter's TTHM result, divided by 4 to determine an average, exceeds 0.080 mg/L, or where the sum of the two previous quarters' HAA5 results plus twice the current quarter's HAA5 result, divided by 4 to determine an average, exceeds 0.060 mg/L.
- (b)
  - (1) If you exceed the operational evaluation level, you must conduct an operational evaluation and submit a written report of the evaluation to the State no later than 90 days after being notified of the analytical result that causes you to exceed the operational evaluation level. The written report must be made available to the public upon request.
  - (2) Your operational evaluation must include an examination of system treatment and distribution operational practices, including storage tank operations, excess storage capacity, distribution system flushing, changes in sources or source water quality, and treatment changes or problems that may contribute to TTHM and HAA5 formation and what steps could be considered to minimize future exceedances.
    - (i) You may request and the State may allow you to limit the scope of your evaluation if you are able to identify the cause of the operational evaluation level exceedance.
    - (ii) Your request to limit the scope of the evaluation does not extend the schedule in paragraph (b)(1) of this section for submitting the written report. The State must approve this limited scope of evaluation in writing and you must keep that approval with the completed report.

#### § 141.627 Requirements for remaining on reduced TTHM and HAA5 monitoring based on subpart L results.

You may remain on reduced monitoring after the dates identified in § 141.620(c) for compliance with this subpart only if you qualify for a 40/30 certification under § 141.603 or have received a very small system waiver under § 141.604, plus you meet the reduced monitoring criteria in § 141.623(a), and you do not change or add monitoring locations from those used for compliance monitoring under subpart L of this part. If your monitoring locations under this subpart differ from your monitoring locations under subpart L of this part, you may not remain on reduced monitoring after the dates identified in § 141.620(c) for compliance with this subpart.

## **§ 141.628 Requirements for remaining on increased TTHM and HAA5 monitoring based on subpart L results.**

If you were on increased monitoring under § 141.132(b)(1), you must remain on increased monitoring until you qualify for a return to routine monitoring under § 141.625(c). You must conduct increased monitoring under § 141.625 at the monitoring locations in the monitoring plan developed under § 141.622 beginning at the date identified in § 141.620(c) for compliance with this subpart and remain on increased monitoring until you qualify for a return to routine monitoring under § 141.625(c).

## **§ 141.629 Reporting and recordkeeping requirements.**

### **(a) Reporting.**

- (1) You must report the following information for each monitoring location to the State within 10 days of the end of any quarter in which monitoring is required:
  - (i) Number of samples taken during the last quarter.
  - (ii) Date and results of each sample taken during the last quarter.
  - (iii) Arithmetic average of quarterly results for the last four quarters for each monitoring location (LRAA), beginning at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter. If the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters, you must report this information to the State as part of the first report due following the compliance date or anytime thereafter that this determination is made. If you are required to conduct monitoring at a frequency that is less than quarterly, you must make compliance calculations beginning with the first compliance sample taken after the compliance date, unless you are required to conduct increased monitoring under § 141.625.
  - (iv) Whether, based on § 141.64(b)(2) and this subpart, the MCL was violated at any monitoring location.
  - (v) Any operational evaluation levels that were exceeded during the quarter and, if so, the location and date, and the calculated TTHM and HAA5 levels.
- (2) If you are a subpart H system seeking to qualify for or remain on reduced TTHM/HAA5 monitoring, you must report the following source water TOC information for each treatment plant that treats surface water or ground water under the direct influence of surface water to the State within 10 days of the end of any quarter in which monitoring is required:
  - (i) The number of source water TOC samples taken each month during last quarter.
  - (ii) The date and result of each sample taken during last quarter.
  - (iii) The quarterly average of monthly samples taken during last quarter or the result of the quarterly sample.
  - (iv) The running annual average (RAA) of quarterly averages from the past four quarters.
  - (v) Whether the RAA exceeded 4.0 mg/L.
- (3) The State may choose to perform calculations and determine whether the MCL was exceeded or the system is eligible for reduced monitoring in lieu of having the system report that information

- (b) **Recordkeeping.** You must retain any subpart V monitoring plans and your subpart V monitoring results as required by § 141.33.

## Subpart W—Enhanced Treatment for *Cryptosporidium*

**Source:** 71 FR 769, Jan. 5, 2006, unless otherwise noted.

### GENERAL REQUIREMENTS

#### § 141.700 General requirements.

- (a) The requirements of this subpart W are national primary drinking water regulations. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for *Cryptosporidium*. These requirements are in addition to requirements for filtration and disinfection in subparts H, P, and T of this part.
- (b) **Applicability.** The requirements of this subpart apply to all subpart H systems, which are public water systems supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water.
- (1) Wholesale systems, as defined in § 141.2, must comply with the requirements of this subpart based on the population of the largest system in the combined distribution system.
- (2) The requirements of this subpart for filtered systems apply to systems required by National Primary Drinking Water Regulations to provide filtration treatment, whether or not the system is currently operating a filtration system.
- (3) The requirements of this subpart for unfiltered systems apply only to unfiltered systems that timely met and continue to meet the filtration avoidance criteria in subparts H, P, and T of this part, as applicable.
- (c) **Requirements.** Systems subject to this subpart must comply with the following requirements:
- (1) Systems must conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. This monitoring may include sampling for *Cryptosporidium*, *E. coli*, and turbidity as described in §§ 141.701 through 141.706, to determine what level, if any, of additional *Cryptosporidium* treatment they must provide.
- (2) Systems that plan to make a significant change to their disinfection practice must develop disinfection profiles and calculate disinfection benchmarks, as described in §§ 141.708 through 141.709.
- (3) Filtered systems must determine their *Cryptosporidium* treatment bin classification as described in § 141.710 and provide additional treatment for *Cryptosporidium*, if required, as described in § 141.711. All unfiltered systems must provide treatment for *Cryptosporidium* as described in § 141.712. Filtered and unfiltered systems must implement *Cryptosporidium* treatment according to the schedule in § 141.713.
- (4) Systems with uncovered finished water storage facilities must comply with the requirements to cover the facility or treat the discharge from the facility as described in § 141.714.
- (5) Systems required to provide additional treatment for *Cryptosporidium* must implement microbial toolbox options that are designed and operated as described in §§ 141.715 through 141.720.

- (6) Systems must comply with the applicable recordkeeping and reporting requirements described in §§ 141.721 through 141.722.
- (7) Systems must address significant deficiencies identified in sanitary surveys performed by EPA as described in § 141.723.

#### SOURCE WATER MONITORING REQUIREMENTS

### § 141.701 Source water monitoring.

- (a) **Initial round of source water monitoring.** Systems must conduct the following monitoring on the schedule in paragraph (c) of this section unless they meet the monitoring exemption criteria in paragraph (d) of this section.
  - (1) Filtered systems serving at least 10,000 people must sample their source water for *Cryptosporidium*, *E. coli*, and turbidity at least monthly for 24 months.
  - (2) Unfiltered systems serving at least 10,000 people must sample their source water for *Cryptosporidium* at least monthly for 24 months.
  - (3)
    - (i) Filtered systems serving fewer than 10,000 people must sample their source water for *E. coli* at least once every two weeks for 12 months.
    - (ii) A filtered system serving fewer than 10,000 people may avoid *E. coli* monitoring if the system notifies the State that it will monitor for *Cryptosporidium* as described in paragraph (a)(4) of this section. The system must notify the State no later than 3 months prior to the date the system is otherwise required to start *E. coli* monitoring under § 141.701(c).
  - (4) Filtered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months if they meet one of the following, based on monitoring conducted under paragraph (a)(3) of this section:
    - (i) For systems using lake/reservoir sources, the annual mean *E. coli* concentration is greater than 10 *E. coli*/100 mL.
    - (ii) For systems using flowing stream sources, the annual mean *E. coli* concentration is greater than 50 *E. coli*/100 mL.
    - (iii) The system does not conduct *E. coli* monitoring as described in paragraph (a)(3) of this section.
    - (iv) Systems using ground water under the direct influence of surface water (GWUDI) must comply with the requirements of paragraph (a)(4) of this section based on the *E. coli* level that applies to the nearest surface water body. If no surface water body is nearby, the system must comply based on the requirements that apply to systems using lake/reservoir sources.
  - (5) For filtered systems serving fewer than 10,000 people, the State may approve monitoring for an indicator other than *E. coli* under paragraph (a)(3) of this section. The State also may approve an alternative to the *E. coli* concentration in paragraph (a)(4)(i), (ii) or (iv) of this section to trigger *Cryptosporidium* monitoring. This approval by the State must be provided to the system in writing

and must include the basis for the State's determination that the alternative indicator and/or trigger level will provide a more accurate identification of whether a system will exceed the Bin 1 *Cryptosporidium* level in § 141.710.

- (6) Unfiltered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months.
- (7) Systems may sample more frequently than required under this section if the sampling frequency is evenly spaced throughout the monitoring period.
- (b) **Second round of source water monitoring.** Systems must conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in paragraph (a) of this section, unless they meet the monitoring exemption criteria in paragraph (d) of this section. Systems must conduct this monitoring on the schedule in paragraph (c) of this section.
- (c) **Monitoring schedule.** Systems must begin the monitoring required in paragraphs (a) and (b) of this section no later than the month beginning with the date listed in this table:

**SOURCE WATER MONITORING STARTING DATES TABLE**

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

<sup>a</sup> Applies only to filtered systems.

<sup>b</sup> Applies to filtered systems that meet the conditions of paragraph (a)(4) of this section and unfiltered systems.

(d) **Monitoring avoidance.**

- (1) Filtered systems are not required to conduct source water monitoring under this subpart if the system will provide a total of at least 5.5-log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of Bin 4 in § 141.711.

- (2) Unfiltered systems are not required to conduct source water monitoring under this subpart if the system will provide a total of at least 3-log *Cryptosporidium* inactivation, equivalent to meeting the treatment requirements for unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L in § 141.712.
  - (3) If a system chooses to provide the level of treatment in paragraph (d)(1) or (2) of this section, as applicable, rather than start source water monitoring, the system must notify the State in writing no later than the date the system is otherwise required to submit a sampling schedule for monitoring under § 141.702. Alternatively, a system may choose to stop sampling at any point after it has initiated monitoring if it notifies the State in writing that it will provide this level of treatment. Systems must install and operate technologies to provide this level of treatment by the applicable treatment compliance date in § 141.713.
- (e) **Plants operating only part of the year.** Systems with subpart H plants that operate for only part of the year must conduct source water monitoring in accordance with this subpart, but with the following modifications:
- (1) Systems must sample their source water only during the months that the plant operates unless the State specifies another monitoring period based on plant operating practices.
  - (2) Systems with plants that operate less than six months per year and that monitor for *Cryptosporidium* must collect at least six *Cryptosporidium* samples per year during each of two years of monitoring. Samples must be evenly spaced throughout the period the plant operates.
- (f)
- (1) **New sources.** A system that begins using a new source of surface water or GWUDI after the system is required to begin monitoring under paragraph (c) of this section must monitor the new source on a schedule the State approves. Source water monitoring must meet the requirements of this subpart. The system must also meet the bin classification and *Cryptosporidium* treatment requirements of §§ 141.710 and 141.711 or § 141.712, as applicable, for the new source on a schedule the State approves.
  - (2) The requirements of § 141.701(f) apply to subpart H systems that begin operation after the monitoring start date applicable to the system's size under paragraph (c) of this section.
  - (3) The system must begin a second round of source water monitoring no later than 6 years following initial bin classification under § 141.710 or determination of the mean *Cryptosporidium* level under § 141.712, as applicable.
- (g) Failure to collect any source water sample required under this section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory, and reporting requirements of §§ 141.702 through 141.706 is a monitoring violation.
- (h) **Grandfathering monitoring data.** Systems may use (grandfather) monitoring data collected prior to the applicable monitoring start date in paragraph (c) of this section to meet the initial source water monitoring requirements in paragraph (a) of this section. Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this paragraph must meet the requirements in § 141.707.

## § 141.702 Sampling schedules.

- (a) Systems required to conduct source water monitoring under § 141.701 must submit a sampling schedule that specifies the calendar dates when the system will collect each required sample.
  - (1) Systems must submit sampling schedules no later than 3 months prior to the applicable date listed in § 141.701(c) for each round of required monitoring.
  - (2)
    - (i) Systems serving at least 10,000 people must submit their sampling schedule for the initial round of source water monitoring under § 141.701(a) to EPA electronically at <https://intranet.epa.gov/lt2/>.
    - (ii) If a system is unable to submit the sampling schedule electronically, the system may use an alternative approach for submitting the sampling schedule that EPA approves.
  - (3) Systems serving fewer than 10,000 people must submit their sampling schedules for the initial round of source water monitoring § 141.701(a) to the State.
  - (4) Systems must submit sampling schedules for the second round of source water monitoring § 141.701(b) to the State.
  - (5) If EPA or the State does not respond to a system regarding its sampling schedule, the system must sample at the reported schedule.
- (b) Systems must collect samples within two days before or two days after the dates indicated in their sampling schedule (i.e., within a five-day period around the schedule date) unless one of the conditions of paragraph (b)(1) or (2) of this section applies.
  - (1) If an extreme condition or situation exists that may pose danger to the sample collector, or that cannot be avoided and causes the system to be unable to sample in the scheduled five-day period, the system must sample as close to the scheduled date as is feasible unless the State approves an alternative sampling date. The system must submit an explanation for the delayed sampling date to the State concurrent with the shipment of the sample to the laboratory.
  - (2)
    - (i) If a system is unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements in § 141.704, or the failure of an approved laboratory to analyze the sample, then the system must collect a replacement sample.
    - (ii) The system must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date unless the system demonstrates that collecting a replacement sample within this time frame is not feasible or the State approves an alternative resampling date. The system must submit an explanation for the delayed sampling date to the State concurrent with the shipment of the sample to the laboratory.



- (c) Systems that fail to meet the criteria of paragraph (b) of this section for any source water sample required under § 141.701 must revise their sampling schedules to add dates for collecting all missed samples. Systems must submit the revised schedule to the State for approval prior to when the system begins collecting the missed samples.

### § 141.703 Sampling locations.

- (a) Systems required to conduct source water monitoring under § 141.701 must collect samples for each plant that treats a surface water or GWUDI source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the State may approve one set of monitoring results to be used to satisfy the requirements of § 141.701 for all plants.
- (b)
  - (1) Systems must collect source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants, unless the system meets the condition of paragraph (b)(2) of this section.
  - (2) The State may approve a system to collect a source water sample after chemical treatment. To grant this approval, the State must determine that collecting a sample prior to chemical treatment is not feasible for the system and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample.
- (c) Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition.
- (d) **Bank filtration.**
  - (1) Systems that receive *Cryptosporidium* treatment credit for bank filtration under § 141.173(b) or § 141.552(a), as applicable, must collect source water samples in the surface water prior to bank filtration.
  - (2) Systems that use bank filtration as pretreatment to a filtration plant must collect source water samples from the well (i.e., after bank filtration). Use of bank filtration during monitoring must be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive treatment credit for the bank filtration under § 141.717(c).
- (e) **Multiple sources.** Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, must collect samples as specified in paragraph (e)(1) or (2) of this section. The use of multiple sources during monitoring must be consistent with routine operational practice.
  - (1) If a sampling tap is available where the sources are combined prior to treatment, systems must collect samples from the tap.
  - (2) If a sampling tap where the sources are combined prior to treatment is not available, systems must collect samples at each source near the intake on the same day and must follow either paragraph (e)(2)(i) or (ii) of this section for sample analysis.
    - (i) Systems may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.

- (ii) Systems may analyze samples from each source separately and calculate a weighted average of the analysis results for each sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source contributed to total plant flow at the time the sample was collected and then summing these values.
- (f) **Additional Requirements.** Systems must submit a description of their sampling location(s) to the State at the same time as the sampling schedule required under § 141.702. This description must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle. If the State does not respond to a system regarding sampling location(s), the system must sample at the reported location(s).

## § 141.704 Analytical methods.

- (a) **Cryptosporidium.** Systems must analyze for *Cryptosporidium* using Method 1623: *Cryptosporidium and Giardia in Water by Filtration/IMS/FA*, 2005, United States Environmental Protection Agency, EPA-815-R-05-002 or Method 1622: *Cryptosporidium in Water by Filtration/IMS/FA*, 2005, United States Environmental Protection Agency, EPA-815-R-05-001, which are incorporated by reference, or alternative methods listed in appendix A to subpart C of this part. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods online from <http://www.epa.gov/safewater/disinfection/lt2> or from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave., NW., Washington, DC 20460 (Telephone: 800-426-4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW., Washington, DC (Telephone: 202-566-2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).
- (1) Systems must analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in paragraph (a) of this section. Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters approved by EPA for the methods listed in paragraph (a) of this section, up to a packed pellet volume of at least 2 mL.
- (2)
  - (i) Matrix spike (MS) samples, as required by the methods in paragraph (a) of this section, must be spiked and filtered by a laboratory approved for *Cryptosporidium* analysis under § 141.705.
  - (ii) If the volume of the MS sample is greater than 10 L, the system may filter all but 10 L of the MS sample in the field, and ship the filtered sample and the remaining 10 L of source water to the laboratory. In this case, the laboratory must spike the remaining 10 L of water and filter it through the filter used to collect the balance of the sample in the field.
- (3) Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery (OPR) samples.
- (b) **E. coli.** System must use methods for enumeration of *E. coli* in source water approved in § 136.3(a) of this chapter or alternative methods listed in appendix A to subpart C of this part.
  - (1) The time from sample collection to initiation of analysis may not exceed 30 hours unless the system meets the condition of paragraph (b)(2) of this section.

- (2) The State may approve on a case-by-case basis the holding of an *E. coli* sample for up to 48 hours between sample collection and initiation of analysis if the State determines that analyzing an *E. coli* sample within 30 hours is not feasible. *E. coli* samples held between 30 to 48 hours must be analyzed by the Colilert reagent version of Standard Method 9223B as listed in § 136.3(a) of this title.
- (3) Systems must maintain samples between 0 °C and 10 °C during storage and transit to the laboratory.
- (c) **Turbidity.** Systems must use methods for turbidity measurement approved in § 141.74(a)(1).

[71 FR 769, Jan. 5, 2006, as amended at 74 FR 30959, June 29, 2009]

### § 141.705 Approved laboratories.

- (a) **Cryptosporidium.** Systems must have *Cryptosporidium* samples analyzed by a laboratory that is approved under EPA's Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water or a laboratory that has been certified for *Cryptosporidium* analysis by an equivalent State laboratory certification program.
- (b) ***E. coli*.** Any laboratory certified by the EPA, the National Environmental Laboratory Accreditation Conference or the State for total coliform or fecal coliform analysis under § 141.74 is approved for *E. coli* analysis under this subpart when the laboratory uses the same technique for *E. coli* that the laboratory uses for § 141.74.
- (c) **Turbidity.** Measurements of turbidity must be made by a party approved by the State.

### § 141.706 Reporting source water monitoring results.

- (a) Systems must report results from the source water monitoring required under § 141.701 no later than 10 days after the end of the first month following the month when the sample is collected.
- (b)
  - (1) All systems serving at least 10,000 people must report the results from the initial source water monitoring required under § 141.701(a) to EPA electronically at <https://intranet.epa.gov/lt2/>.
  - (2) If a system is unable to report monitoring results electronically, the system may use an alternative approach for reporting monitoring results that EPA approves.
- (c) Systems serving fewer than 10,000 people must report results from the initial source water monitoring required under § 141.701(a) to the State.
- (d) All systems must report results from the second round of source water monitoring required under § 141.701(b) to the State.
- (e) Systems must report the applicable information in paragraphs (e)(1) and (2) of this section for the source water monitoring required under § 141.701.

- (1) Systems must report the following data elements for each *Cryptosporidium* analysis:

**Data element.**

1. PWS ID.
2. Facility ID.
3. Sample collection date.
4. Sample type (field or matrix spike).
5. Sample volume filtered (L), to nearest 1/4 L.
6. Was 100% of filtered volume examined.
7. Number of oocysts counted.

- (i) For matrix spike samples, systems must also report the sample volume spiked and estimated number of oocysts spiked. These data are not required for field samples.
- (ii) For samples in which less than 10 L is filtered or less than 100% of the sample volume is examined, systems must also report the number of filters used and the packed pellet volume.
- (iii) For samples in which less than 100% of sample volume is examined, systems must also report the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.

- (2) Systems must report the following data elements for each *E. coli* analysis:

**Data element.**

1. PWS ID.
2. Facility ID.
3. Sample collection date.
4. Analytical method number.
5. Method type.
6. Source type (flowing stream, lake/reservoir, GWUDI).
7. *E. coli*/100 mL.
8. Turbidity.<sup>1</sup>

<sup>1</sup> Systems serving fewer than 10,000 people that are not required to monitor for turbidity under § 141.701 are not required to report turbidity with their *E. coli* results.

## § 141.707 Grandfathering previously collected data.

(a)

- (1) Systems may comply with the initial source water monitoring requirements of § 141.701(a) by grandfathering sample results collected before the system is required to begin monitoring (i.e., previously collected data). To be grandfathered, the sample results and analysis must meet the criteria in this section and the State must approve.
- (2) A filtered system may grandfather *Cryptosporidium* samples to meet the requirements of § 141.701(a) when the system does not have corresponding *E. coli* and turbidity samples. A system that grandfathers *Cryptosporidium* samples without *E. coli* and turbidity samples is not required to collect *E. coli* and turbidity samples when the system completes the requirements for *Cryptosporidium* monitoring under § 141.701(a).
- (b) ***E. coli* sample analysis.** The analysis of *E. coli* samples must meet the analytical method and approved laboratory requirements of §§ 141.704 through 141.705.
- (c) ***Cryptosporidium* sample analysis.** The analysis of *Cryptosporidium* samples must meet the criteria in this paragraph.
  - (1) Laboratories analyzed *Cryptosporidium* samples using one of the analytical methods in paragraphs (c)(1)(i) through (vi) of this section, which are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods on-line from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave, NW, Washington, DC 20460 (Telephone: 800-426-4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202-566-2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).
    - (i) **Method 1623: *Cryptosporidium* and *Giardia* in Water by Filtration/IMS/FA**, 2005, United States Environmental Protection Agency, EPA-815-R-05-002.
    - (ii) **Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA**, 2005, United States Environmental Protection Agency, EPA-815-R-05-001.
    - (iii) **Method 1623: *Cryptosporidium* and *Giardia* in Water by Filtration/IMS/FA**, 2001, United States Environmental Protection Agency, EPA-821-R-01-025.
    - (iv) **Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA**, 2001, United States Environmental Protection Agency, EPA-821-R-01-026.
    - (v) **Method 1623: *Cryptosporidium* and *Giardia* in Water by Filtration/IMS/FA**, 1999, United States Environmental Protection Agency, EPA-821-R-99-006.
    - (vi) **Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA**, 1999, United States Environmental Protection Agency, EPA-821-R-99-001.
  - (2) For each *Cryptosporidium* sample, the laboratory analyzed at least 10 L of sample or at least 2 mL of packed pellet or as much volume as could be filtered by 2 filters that EPA approved for the methods listed in paragraph (c)(1) of this section.
- (d) **Sampling location.** The sampling location must meet the conditions in § 141.703.

- (e) **Sampling frequency.** *Cryptosporidium* samples were collected no less frequently than each calendar month on a regular schedule, beginning no earlier than January 1999. Sample collection intervals may vary for the conditions specified in § 141.702(b)(1) and (2) if the system provides documentation of the condition when reporting monitoring results.
- (1) The State may approve grandfathering of previously collected data where there are time gaps in the sampling frequency if the system conducts additional monitoring the State specifies to ensure that the data used to comply with the initial source water monitoring requirements of § 141.701(a) are seasonally representative and unbiased.
  - (2) Systems may grandfather previously collected data where the sampling frequency within each month varied. If the *Cryptosporidium* sampling frequency varied, systems must follow the monthly averaging procedure in § 141.710(b)(5) or § 141.712(a)(3), as applicable, when calculating the bin classification for filtered systems or the mean *Cryptosporidium* concentration for unfiltered systems.
- (f) **Reporting monitoring results for grandfathering.** Systems that request to grandfather previously collected monitoring results must report the following information by the applicable dates listed in this paragraph. Systems serving at least 10,000 people must report this information to EPA unless the State approves reporting to the State rather than EPA. Systems serving fewer than 10,000 people must report this information to the State.
- (1) Systems must report that they intend to submit previously collected monitoring results for grandfathering. This report must specify the number of previously collected results the system will submit, the dates of the first and last sample, and whether a system will conduct additional source water monitoring to meet the requirements of § 141.701(a). Systems must report this information no later than the date the sampling schedule under § 141.702 is required.
  - (2) Systems must report previously collected monitoring results for grandfathering, along with the associated documentation listed in paragraphs (f)(2)(i) through (iv) of this section, no later than two months after the applicable date listed in § 141.701(c).
    - (i) For each sample result, systems must report the applicable data elements in § 141.706.
    - (ii) Systems must certify that the reported monitoring results include all results the system generated during the time period beginning with the first reported result and ending with the final reported result. This applies to samples that were collected from the sampling location specified for source water monitoring under this subpart, not spiked, and analyzed using the laboratory's routine process for the analytical methods listed in this section.
    - (iii) Systems must certify that the samples were representative of a plant's source water(s) and the source water(s) have not changed. Systems must report a description of the sampling location(s), which must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including points of chemical addition and filter backwash recycle.
    - (iv) For *Cryptosporidium* samples, the laboratory or laboratories that analyzed the samples must provide a letter certifying that the quality control criteria specified in the methods listed in paragraph (c)(1) of this section were met for each sample batch associated with the reported results. Alternatively, the laboratory may provide bench sheets and sample examination report forms for each field, matrix spike, IPR, OPR, and method blank sample associated with the reported results.

- (g) If the State determines that a previously collected data set submitted for grandfathering was generated during source water conditions that were not normal for the system, such as a drought, the State may disapprove the data. Alternatively, the State may approve the previously collected data if the system reports additional source water monitoring data, as determined by the State, to ensure that the data set used under § 141.710 or § 141.712 represents average source water conditions for the system.
- (h) If a system submits previously collected data that fully meet the number of samples required for initial source water monitoring under § 141.701(a) and some of the data are rejected due to not meeting the requirements of this section, systems must conduct additional monitoring to replace rejected data on a schedule the State approves. Systems are not required to begin this additional monitoring until two months after notification that data have been rejected and additional monitoring is necessary.

## DISINFECTION PROFILING AND BENCHMARKING REQUIREMENTS

### § 141.708 Requirements when making a significant change in disinfection practice.

- (a) Following the completion of initial source water monitoring under § 141.701(a), a system that plans to make a significant change to its disinfection practice, as defined in paragraph (b) of this section, must develop disinfection profiles and calculate disinfection benchmarks for *Giardia lamblia* and viruses as described in § 141.709. Prior to changing the disinfection practice, the system must notify the State and must include in this notice the information in paragraphs (a)(1) through (3) of this section.
  - (1) A completed disinfection profile and disinfection benchmark for *Giardia lamblia* and viruses as described in § 141.709.
  - (2) A description of the proposed change in disinfection practice.
  - (3) An analysis of how the proposed change will affect the current level of disinfection.
- (b) Significant changes to disinfection practice are defined as follows:
  - (1) Changes to the point of disinfection;
  - (2) Changes to the disinfectant(s) used in the treatment plant;
  - (3) Changes to the disinfection process; or
  - (4) Any other modification identified by the State as a significant change to disinfection practice.

### § 141.709 Developing the disinfection profile and benchmark.

- (a) Systems required to develop disinfection profiles under § 141.708 must follow the requirements of this section. Systems must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for *Giardia lamblia* and viruses. If systems monitor more frequently, the monitoring frequency must be evenly spaced. Systems that operate for fewer than 12 months per year must monitor weekly during the period of operation. Systems must determine log inactivation for *Giardia lamblia* through the entire plant, based on CT<sub>99,9</sub> values in Tables 1.1 through 1.6, 2.1 and 3.1 of § 141.74(b) as applicable. Systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the State.

- (b) Systems with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in paragraphs (b)(1) through (4) of this section. Systems with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(1) through (4) of this section for each disinfection segment. Systems must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in § 141.74(a).
  - (1) For systems using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.
  - (2) For systems using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.
  - (3) The disinfectant contact time(s) (t) must be determined during peak hourly flow.
  - (4) The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfectant application must be measured during peak hourly flow.
- (c) In lieu of conducting new monitoring under paragraph (b) of this section, systems may elect to meet the requirements of paragraphs (c)(1) or (2) of this section.
  - (1) Systems that have at least one year of existing data that are substantially equivalent to data collected under the provisions of paragraph (b) of this section may use these data to develop disinfection profiles as specified in this section if the system has neither made a significant change to its treatment practice nor changed sources since the data were collected. Systems may develop disinfection profiles using up to three years of existing data.
  - (2) Systems may use disinfection profile(s) developed under § 141.172 or §§ 141.530 through 141.536 in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Systems that have not developed a virus profile under § 141.172 or §§ 141.530 through 141.536 must develop a virus profile using the same monitoring data on which the *Giardia lamblia* profile is based.
- (d) Systems must calculate the total inactivation ratio for *Giardia lamblia* as specified in paragraphs (d)(1) through (3) of this section.
  - (1) Systems using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the methods in paragraph (d)(1)(i) or (ii) of this section.
    - (i) Determine one inactivation ratio ( $CT_{calc}/CT_{99.9}$ ) before or at the first customer during peak hourly flow.
    - (ii) Determine successive  $CT_{calc}/CT_{99.9}$  values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The system must calculate the total inactivation ratio by determining ( $CT_{calc}/CT_{99.9}$ ) for each sequence and then adding the ( $CT_{calc}/CT_{99.9}$ ) values together to determine ( $\Sigma (CT_{calc}/CT_{99.9})$ ).



- (2) Systems using more than one point of disinfectant application before the first customer must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The  $(CT_{calc}/CT_{99.9})$  value of each segment and  $(\Sigma (CT_{calc}/CT_{99.9}))$  must be calculated using the method in paragraph (d)(1)(ii) of this section.
- (3) The system must determine the total logs of inactivation by multiplying the value calculated in paragraph (d)(1) or (d)(2) of this section by 3.0.
- (4) Systems must calculate the log of inactivation for viruses using a protocol approved by the State.
- (e) Systems must use the procedures specified in paragraphs (e)(1) and (2) of this section to calculate a disinfection benchmark.
  - (1) For each year of profiling data collected and calculated under paragraphs (a) through (d) of this section, systems must determine the lowest mean monthly level of both *Giardia lamblia* and virus inactivation. Systems must determine the mean *Giardia lamblia* and virus inactivation for each calendar month for each year of profiling data by dividing the sum of daily or weekly *Giardia lamblia* and virus log inactivation by the number of values calculated for that month.
  - (2) The disinfection benchmark is the lowest monthly mean value (for systems with one year of profiling data) or the mean of the lowest monthly mean values (for systems with more than one year of profiling data) of *Giardia lamblia* and virus log inactivation in each year of profiling data.

#### TREATMENT TECHNIQUE REQUIREMENTS

#### § 141.710 Bin classification for filtered systems.

- (a) Following completion of the initial round of source water monitoring required under § 141.701(a), filtered systems must calculate an initial *Cryptosporidium* bin concentration for each plant for which monitoring was required. Calculation of the bin concentration must use the *Cryptosporidium* results reported under § 141.701(a) and must follow the procedures in paragraphs (b)(1) through (5) of this section.
- (b)
  - (1) For systems that collect a total of at least 48 samples, the bin concentration is equal to the arithmetic mean of all sample concentrations.
  - (2) For systems that collect a total of at least 24 samples, but not more than 47 samples, the bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.
  - (3) For systems that serve fewer than 10,000 people and monitor for *Cryptosporidium* for only one year (i.e., collect 24 samples in 12 months), the bin concentration is equal to the arithmetic mean of all sample concentrations.
  - (4) For systems with plants operating only part of the year that monitor fewer than 12 months per year under § 141.701(e), the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of *Cryptosporidium* monitoring.

- (5) If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in paragraphs (b)(1) through (4) of this section.
- (c) Filtered systems must determine their initial bin classification from the following table and using the *Cryptosporidium* bin concentration calculated under paragraphs (a)-(b) of this section:

**BIN CLASSIFICATION TABLE FOR FILTERED SYSTEMS**

For systems that are:	With a <i>Cryptosporidium</i> bin concentration of . . . <sup>1</sup>	The bin classification is . . .
. . . required to monitor for <i>Cryptosporidium</i> under § 141.701	<i>Cryptosporidium</i> <0.075 oocyst/L	Bin 1.
	0.075 oocysts/L	Bin 2.
	≤ <i>Cryptosporidium</i> <1.0 oocysts/L	Bin 3.
	1.0 oocysts/L	Bin 4.
. . . serving fewer than 10,000 people and NOT required to monitor for <i>Cryptosporidium</i> under § 141.701(a)(4)	≤ <i>Cryptosporidium</i> <3.0 oocysts/L	Bin 4.
	<i>Cryptosporidium</i> ≥3.0 oocysts/L	Bin 1.
	NA	Bin 1.

<sup>1</sup> Based on calculations in paragraph (a) or (d) of this section, as applicable.

- (d) Following completion of the second round of source water monitoring required under § 141.701(b), filtered systems must recalculate their *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under § 141.701(b) and following the procedures in paragraphs (b)(1) through (4) of this section. Systems must then redetermine their bin classification using this bin concentration and the table in paragraph (c) of this section.
- (e)
- (1) Filtered systems must report their initial bin classification under paragraph (c) of this section to the State for approval no later than 6 months after the system is required to complete initial source water monitoring based on the schedule in § 141.701(c).
- (2) Systems must report their bin classification under paragraph (d) of this section to the State for approval no later than 6 months after the system is required to complete the second round of source water monitoring based on the schedule in § 141.701(c).
- (3) The bin classification report to the State must include a summary of source water monitoring data and the calculation procedure used to determine bin classification.

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

**§ 141.711 Filtered system additional *Cryptosporidium* treatment requirements.**

- (a) Filtered systems must provide the level of additional treatment for *Cryptosporidium* specified in this paragraph based on their bin classification as determined under § 141.710 and according to the schedule in § 141.713.

If the system bin classification is . . .	And the system uses the following filtration treatment in full compliance with subparts H, P, and T of this part (as applicable), then the additional <i>Cryptosporidium</i> treatment requirements are . . .			
	Conventional filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration	Alternative filtration technologies
Bin 1	No additional treatment	No additional treatment	No additional treatment	No additional treatment.
Bin 2	1-log treatment	1.5-log treatment	1-log treatment	<sup>(1)</sup>
Bin 3	2-log treatment	2.5-log treatment	2-log treatment	<sup>(2)</sup>
Bin 4	2.5-log treatment	3-log treatment	2.5-log treatment	<sup>(3)</sup>

<sup>1</sup> As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 4.0-log.

<sup>2</sup> As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 5.0-log.

<sup>3</sup> As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 5.5-log.

(b)

- (1) Filtered systems must use one or more of the treatment and management options listed in § 141.715, termed the microbial toolbox, to comply with the additional *Cryptosporidium* treatment required in paragraph (a) of this section.
- (2) Systems classified in Bin 3 and Bin 4 must achieve at least 1-log of the additional *Cryptosporidium* treatment required under paragraph (a) of this section using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or UV, as described in §§ 141.716 through 141.720.

- (c) Failure by a system in any month to achieve treatment credit by meeting criteria in §§ 141.716 through 141.720 for microbial toolbox options that is at least equal to the level of treatment required in paragraph (a) of this section is a violation of the treatment technique requirement.

- (d) If the State determines during a sanitary survey or an equivalent source water assessment that after a system completed the monitoring conducted under § 141.701(a) or § 141.701(b), significant changes occurred in the system's watershed that could lead to increased contamination of the source water by *Cryptosporidium*, the system must take actions specified by the State to address the contamination. These actions may include additional source water monitoring and/or implementing microbial toolbox options listed in § 141.715.

#### § 141.712 Unfiltered system *Cryptosporidium* treatment requirements.

(a) **Determination of mean *Cryptosporidium* level.**

- (1) Following completion of the initial source water monitoring required under § 141.701(a), unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under § 141.701(a). Systems must report this value to the State for approval no later than 6 months after the month the system is required to complete initial source water monitoring based on the schedule in § 141.701(c).
- (2) Following completion of the second round of source water monitoring required under § 141.701(b), unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under § 141.701(b). Systems must report this value to the State for approval no later than 6 months after the month the system is required to complete the second round of source water monitoring based on the schedule in § 141.701(c).
- (3) If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the calculation of the mean *Cryptosporidium* level in paragraphs (a)(1) or (2) of this section.
- (4) The report to the State of the mean *Cryptosporidium* levels calculated under paragraphs (a)(1) and (2) of this section must include a summary of the source water monitoring data used for the calculation.
- (5) Failure to comply with the conditions of paragraph (a) of this section is a violation of the treatment technique requirement.

(b) ***Cryptosporidium* inactivation requirements.** Unfiltered systems must provide the level of inactivation for *Cryptosporidium* specified in this paragraph, based on their mean *Cryptosporidium* levels as determined under paragraph (a) of this section and according to the schedule in § 141.713.

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

(c) **Inactivation treatment technology requirements.** Unfiltered systems must use chlorine dioxide, ozone, or UV as described in § 141.720 to meet the *Cryptosporidium* inactivation requirements of this section.

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

(2) Systems that use UV light and fail to achieve the *Cryptosporidium* inactivation required in paragraph (b) of this section by meeting the criteria in § 141.720(d)(3)(ii) are in violation of the treatment technique requirement.

(d) **Use of two disinfectants.** Unfiltered systems must meet the combined *Cryptosporidium* inactivation requirements of this section and *Giardia lamblia* and virus inactivation requirements of § 141.72(a) using a minimum of two disinfectants, and each of two disinfectants must separately achieve the total inactivation required for either *Cryptosporidium*, *Giardia lamblia*, or viruses.

### § 141.713 Schedule for compliance with *Cryptosporidium* treatment requirements.

- (a) Following initial bin classification under § 141.710(c), filtered systems must provide the level of treatment for *Cryptosporidium* required under § 141.711 according to the schedule in paragraph (c) of this section.
- (b) Following initial determination of the mean *Cryptosporidium* level under § 141.712(a)(1), unfiltered systems must provide the level of treatment for *Cryptosporidium* required under § 141.712 according to the schedule in paragraph (c) of this section.
- (c) ***Cryptosporidium* treatment compliance dates.**

#### CRYPTOSPORIDIUM TREATMENT COMPLIANCE DATES TABLE

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

<sup>a</sup> States may allow up to an additional two years for complying with the treatment requirement for systems making capital improvements.

- (d) If the bin classification for a filtered system changes following the second round of source water monitoring, as determined under § 141.710(d), the system must provide the level of treatment for *Cryptosporidium* required under § 141.711 on a schedule the State approves.
- (e) If the mean *Cryptosporidium* level for an unfiltered system changes following the second round of monitoring, as determined under § 141.712(a)(2), and if the system must provide a different level of *Cryptosporidium* treatment under § 141.712 due to this change, the system must meet this treatment requirement on a schedule the State approves.

### § 141.714 Requirements for uncovered finished water storage facilities.

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

- (b) Systems must notify the State of the use of each uncovered finished water storage facility no later than April 1, 2008.
- (c) Systems must meet the conditions of paragraph (c)(1) or (2) of this section for each uncovered finished water storage facility or be in compliance with a State-approved schedule to meet these conditions no later than April 1, 2009.
  - (1) Systems must cover any uncovered finished water storage facility.
  - (2) Systems must treat the discharge from the uncovered finished water storage facility to the distribution system to achieve inactivation and/or removal of at least 4-log virus, 3-log *Giardia lamblia*, and 2-log *Cryptosporidium* using a protocol approved by the State.
- (d) Failure to comply with the requirements of this section is a violation of the treatment technique requirement.

#### REQUIREMENTS FOR MICROBIAL TOOLBOX COMPONENTS

### § 141.715 Microbial toolbox options for meeting *Cryptosporidium* treatment requirements.

- (a)
  - (1) Systems receive the treatment credits listed in the table in paragraph (b) of this section by meeting the conditions for microbial toolbox options described in §§ 141.716 through 141.720. Systems apply these treatment credits to meet the treatment requirements in § 141.711 or § 141.712, as applicable.
  - (2) Unfiltered systems are eligible for treatment credits for the microbial toolbox options described in § 141.720 only.
- (b) The following table summarizes options in the microbial toolbox:

#### MICROBIAL TOOLBOX SUMMARY TABLE: OPTIONS, TREATMENT CREDITS AND CRITERIA

Toolbox Option	<i>Cryptosporidium</i> treatment credit with design and implementation criteria
SOURCE PROTECTION AND MANAGEMENT TOOLBOX OPTIONS	
(1) Watershed control program	0.5-log credit for State-approved program comprising required elements, annual program status report to State, and regular watershed survey. Unfiltered systems are not eligible for credit. Specific criteria are in § 141.716(a).
(2) Alternative source/intake management	No prescribed credit. Systems may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria are in § 141.716(b).
PRE FILTRATION TOOLBOX OPTIONS	
(3) Presedimentation	0.5-log credit during any month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative State-approved

Toolbox Option	<i>Cryptosporidium</i> treatment credit with design and implementation criteria
basin with coagulation	performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through basins. Specific criteria are in § 141.717(a).
(4) Two-stage lime softening	0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow must pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria are in § 141.717(b).
(5) Bank filtration	0.5-log credit for 25-foot setback; 1.0-log credit for 50-foot setback; aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU. Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit. Specific criteria are in § 141.717(c).
TREATMENT PERFORMANCE TOOLBOX OPTIONS	
(6) Combined filter performance	0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria are in § 141.718(a).
(7) Individual filter performance	0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria are in § 141.718(b).
(8) Demonstration of performance	Credit awarded to unit process or treatment train based on a demonstration to the State with a State- approved protocol. Specific criteria are in § 141.718(c).
ADDITIONAL FILTRATION TOOLBOX OPTIONS	
(9) Bag or cartridge filters (individual filters)	Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety. Specific criteria are in § 141.719(a).
(10) Bag or cartridge filters (in series)	Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria are in § 141.719(a).
(11) Membrane filtration	Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria are in § 141.719(b).
(12) Second stage filtration	0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation prior to first filter. Specific criteria are in § 141.719(c).
(13) Slow sand filters	2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria are in § 141.719(d).
INACTIVATION TOOLBOX OPTIONS	
(14) Chlorine	Log credit based on measured CT in relation to CT table. Specific criteria in §

Toolbox Option	<i>Cryptosporidium</i> treatment credit with design and implementation criteria
dioxide	141.720(b)
(15) Ozone	Log credit based on measured CT in relation to CT table. Specific criteria in § 141.720(b).
(16) UV	Log credit based on validated UV dose in relation to UV dose table; reactor validation testing required to establish UV dose and associated operating conditions. Specific criteria in § 141.720(d).

## § 141.716 Source toolbox components.

- (a) **Watershed control program.** Systems receive 0.5-log *Cryptosporidium* treatment credit for implementing a watershed control program that meets the requirements of this section.
- (1) Systems that intend to apply for the watershed control program credit must notify the State of this intent no later than two years prior to the treatment compliance date applicable to the system in § 141.713.
  - (2) Systems must submit to the State a proposed watershed control plan no later than one year before the applicable treatment compliance date in § 141.713. The State must approve the watershed control plan for the system to receive watershed control program treatment credit. The watershed control plan must include the elements in paragraphs (a)(2)(i) through (iv) of this section.
    - (i) Identification of an “area of influence” outside of which the likelihood of *Cryptosporidium* or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys under paragraph (a)(5)(ii) of this section.
    - (ii) Identification of both potential and actual sources of *Cryptosporidium* contamination and an assessment of the relative impact of these sources on the system's source water quality.
    - (iii) An analysis of the effectiveness and feasibility of control measures that could reduce *Cryptosporidium* loading from sources of contamination to the system's source water.
    - (iv) A statement of goals and specific actions the system will undertake to reduce source water *Cryptosporidium* levels. The plan must explain how the actions are expected to contribute to specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.
  - (3) Systems with existing watershed control programs (*i.e.*, programs in place on January 5, 2006) are eligible to seek this credit. Their watershed control plans must meet the criteria in paragraph (a)(2) of this section and must specify ongoing and future actions that will reduce source water *Cryptosporidium* levels.
  - (4) If the State does not respond to a system regarding approval of a watershed control plan submitted under this section and the system meets the other requirements of this section, the watershed control program will be considered approved and 0.5 log *Cryptosporidium* treatment credit will be awarded unless and until the State subsequently withdraws such approval.



- (5) Systems must complete the actions in paragraphs (a)(5)(i) through (iii) of this section to maintain the 0.5-log credit.
    - (i) Submit an annual watershed control program status report to the State. The annual watershed control program status report must describe the system's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the State or as the result of the watershed survey conducted under paragraph (a)(5)(ii) of this section. It must also describe any significant changes that have occurred in the watershed since the last watershed sanitary survey. If a system determines during implementation that making a significant change to its approved watershed control program is necessary, the system must notify the State prior to making any such changes. If any change is likely to reduce the level of source water protection, the system must also list in its notification the actions the system will take to mitigate this effect.
    - (ii) Undergo a watershed sanitary survey every three years for community water systems and every five years for noncommunity water systems and submit the survey report to the State. The survey must be conducted according to State guidelines and by persons the State approves.
      - (A) The watershed sanitary survey must meet the following criteria: encompass the region identified in the State-approved watershed control plan as the area of influence; assess the implementation of actions to reduce source water *Cryptosporidium* levels; and identify any significant new sources of *Cryptosporidium*.
      - (B) If the State determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, systems must undergo another watershed sanitary survey by a date the State requires, which may be earlier than the regular date in paragraph (a)(5)(ii) of this section.
    - (iii) The system must make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon request. These documents must be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The State may approve systems to withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.
  - (6) If the State determines that a system is not carrying out the approved watershed control plan, the State may withdraw the watershed control program treatment credit.
- (b) **Alternative source.**
- (1) A system may conduct source water monitoring that reflects a different intake location (either in the same source or for an alternate source) or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the State approves, a system may determine its bin classification under § 141.710 based on the alternative source monitoring results.
  - (2) If systems conduct alternative source monitoring under paragraph (b)(1) of this section, systems must also monitor their current plant intake concurrently as described in § 141.701.

- (3) Alternative source monitoring under paragraph (b)(1) of this section must meet the requirements for source monitoring to determine bin classification, as described in §§ 141.701 through 141.706. Systems must report the alternative source monitoring results to the State, along with supporting information documenting the operating conditions under which the samples were collected.
- (4) If a system determines its bin classification under § 141.710 using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the system must relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in § 141.713.

#### § 141.717 Pre-filtration treatment toolbox components.

- (a) **Presedimentation.** Systems receive 0.5-log *Cryptosporidium* treatment credit for a presedimentation basin during any month the process meets the criteria in this paragraph.
  - (1) The presedimentation basin must be in continuous operation and must treat the entire plant flow taken from a surface water or GWUDI source.
  - (2) The system must continuously add a coagulant to the presedimentation basin.
  - (3) The presedimentation basin must achieve the performance criteria in paragraph (3)(i) or (ii) of this section.
    - (i) Demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent and must be calculated as follows:  $\log_{10}(\text{monthly mean of daily influent turbidity}) - \log_{10}(\text{monthly mean of daily effluent turbidity})$ .
    - (ii) Complies with State-approved performance criteria that demonstrate at least 0.5-log mean removal of micron-sized particulate material through the presedimentation process.
- (b) **Two-stage lime softening.** Systems receive an additional 0.5-log *Cryptosporidium* treatment credit for a two-stage lime softening plant if chemical addition and hardness precipitation occur in two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or GWUDI source.
- (c) **Bank filtration.** Systems receive *Cryptosporidium* treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this paragraph. Systems using bank filtration when they begin source water monitoring under § 141.701(a) must collect samples as described in § 141.703(d) and are not eligible for this credit.
  - (1) Wells with a ground water flow path of at least 25 feet receive 0.5-log treatment credit; wells with a ground water flow path of at least 50 feet receive 1.0-log treatment credit. The ground water flow path must be determined as specified in paragraph (c)(4) of this section.
  - (2) Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. A system must characterize the aquifer at the well site to determine aquifer properties. Systems must extract a core from the aquifer and demonstrate that in at least 90 percent of the core length, grains less than 1.0 mm in diameter constitute at least 10 percent of the core material.
  - (3) Only horizontal and vertical wells are eligible for treatment credit.

- (4) For vertical wells, the ground water flow path is the measured distance from the edge of the surface water body under high flow conditions (determined by the 100 year floodplain elevation boundary or by the floodway, as defined in Federal Emergency Management Agency flood hazard maps) to the well screen. For horizontal wells, the ground water flow path is the measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral screen.
- (5) Systems must monitor each wellhead for turbidity at least once every four hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the system must report this result to the State and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the State determines that microbial removal has been compromised, the State may revoke treatment credit until the system implements corrective actions approved by the State to remediate the problem.
- (6) Springs and infiltration galleries are not eligible for treatment credit under this section, but are eligible for credit under § 141.718(c).
- (7) **Bank filtration demonstration of performance.** The State may approve *Cryptosporidium* treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in paragraphs (c)(1)-(5) of this section.
  - (i) The study must follow a State-approved protocol and must involve the collection of data on the removal of *Cryptosporidium* or a surrogate for *Cryptosporidium* and related hydrogeologic and water quality parameters during the full range of operating conditions.
  - (ii) The study must include sampling both from the production well(s) and from monitoring wells that are screened and located along the shortest flow path between the surface water source and the production well(s).

#### § 141.718 Treatment performance toolbox components.

- (a) **Combined filter performance.** Systems using conventional filtration treatment or direct filtration treatment receive an additional 0.5-log *Cryptosporidium* treatment credit during any month the system meets the criteria in this paragraph. Combined filter effluent (CFE) turbidity must be less than or equal to 0.15 NTU in at least 95 percent of the measurements. Turbidity must be measured as described in § 141.74(a) and (c).
- (b) **Individual filter performance.** Systems using conventional filtration treatment or direct filtration treatment receive 0.5-log *Cryptosporidium* treatment credit, which can be in addition to the 0.5-log credit under paragraph (a) of this section, during any month the system meets the criteria in this paragraph. Compliance with these criteria must be based on individual filter turbidity monitoring as described in § 141.174 or § 141.560, as applicable.
  - (1) The filtered water turbidity for each individual filter must be less than or equal to 0.15 NTU in at least 95 percent of the measurements recorded each month.
  - (2) No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.
  - (3) Any system that has received treatment credit for individual filter performance and fails to meet the requirements of paragraph (b)(1) or (2) of this section during any month does not receive a treatment technique violation under § 141.711(c) if the State determines the following:

- (i) The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance.
  - (ii) The system has experienced no more than two such failures in any calendar year.
- (c) **Demonstration of performance.** The State may approve *Cryptosporidium* treatment credit for drinking water treatment processes based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than or less than the prescribed treatment credits in § 141.711 or §§ 141.717 through 141.720 and may be awarded to treatment processes that do not meet the criteria for the prescribed credits.
- (1) Systems cannot receive the prescribed treatment credit for any toolbox box option in §§ 141.717 through 141.720 if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under this paragraph.
  - (2) The demonstration of performance study must follow a State-approved protocol and must demonstrate the level of *Cryptosporidium* reduction the treatment process will achieve under the full range of expected operating conditions for the system.
  - (3) Approval by the State must be in writing and may include monitoring and treatment performance criteria that the system must demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The State may designate such criteria where necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

#### § 141.719 Additional filtration toolbox components.

- (a) **Bag and cartridge filters.** Systems receive *Cryptosporidium* treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series by meeting the criteria in paragraphs (a)(1) through (10) of this section. To be eligible for this credit, systems must report the results of challenge testing that meets the requirements of paragraphs (a)(2) through (9) of this section to the State. The filters must treat the entire plant flow taken from a subpart H source.
- (1) The *Cryptosporidium* treatment credit awarded to bag or cartridge filters must be based on the removal efficiency demonstrated during challenge testing that is conducted according to the criteria in paragraphs (a)(2) through (a)(9) of this section. A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series must be applied to challenge testing results to determine removal credit. Systems may use results from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria specified in paragraphs (a)(2) through (9) of this section.
  - (2) Challenge testing must be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the system will use for removal of *Cryptosporidium*. Bag or cartridge filters must be challenge tested in the same configuration that the system will use, either as individual filters or as a series configuration of filters.
  - (3) Challenge testing must be conducted using *Cryptosporidium* or a surrogate that is removed no more efficiently than *Cryptosporidium*. The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discreetly quantifying the specific microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.

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

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

- (5) Challenge testing must be conducted at the maximum design flow rate for the filter as specified by the manufacturer.
- (6) Each filter evaluated must be tested for a duration sufficient to reach 100 percent of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of this subpart.
- (7) Removal efficiency of a filter must be determined from the results of the challenge test and expressed in terms of log removal values using the following equation:

$$\text{LRV} = \text{LOG}_{10}(C_f) - \text{LOG}_{10}(C_p)$$

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. In applying this equation, the same units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, then the term  $C_p$  must be set equal to the detection limit.

- (8) Each filter tested must be challenged with the challenge particulate during three periods over the filtration cycle: within two hours of start-up of a new filter; when the pressure drop is between 45 and 55 percent of the terminal pressure drop; and at the end of the cycle after the pressure drop has reached 100 percent of the terminal pressure drop. An LRV must be calculated for each of these challenge periods for each filter tested. The LRV for the filter ( $\text{LRV}_{\text{filter}}$ ) must be assigned the value of the minimum LRV observed during the three challenge periods for that filter.
- (9) If fewer than 20 filters are tested, the overall removal efficiency for the filter product line must be set equal to the lowest  $\text{LRV}_{\text{filter}}$  among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line must be set equal to the 10th percentile of the set of  $\text{LRV}_{\text{filter}}$  values for the various filters tested. The percentile is defined by  $(i/(n + 1))$  where  $i$  is the rank of  $n$  individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.
- (10) If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted to the State.

(b) **Membrane filtration.**

- (1) Systems receive *Cryptosporidium* treatment credit for membrane filtration that meets the criteria of this paragraph. Membrane cartridge filters that meet the definition of membrane filtration in § 141.2 are eligible for this credit. The level of treatment credit a system receives is equal to the lower of the values determined under paragraph (b)(1)(i) and (ii) of this section.
- (i) The removal efficiency demonstrated during challenge testing conducted under the conditions in paragraph (b)(2) of this section.

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

(2) **Challenge testing.** The membrane used by the system must undergo challenge testing to evaluate removal efficiency, and the system must report the results of challenge testing to the State. Challenge testing must be conducted according to the criteria in paragraphs (b)(2)(i) through (vii) of this section. Systems may use data from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria in paragraphs (b)(2)(i) through (vii) of this section.

- (i) Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.
- (ii) Challenge testing must be conducted using *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.
- (iii) The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation:

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

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

$$\text{LRV} = \text{LOG}_{10}(\text{C}_f) - \text{LOG}_{10}(\text{C}_p)$$

Where:

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

- (vi) The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ( $LRV_{C-Test}$ ). If fewer than 20 modules are tested, then  $LRV_{C-Test}$  is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then  $LRV_{C-Test}$  is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by  $(i/(n + 1))$  where  $i$  is the rank of  $n$  individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.
- (vii) The challenge test must establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the *Cryptosporidium* removal capability of the membrane filtration module. This performance test must be applied to each production membrane module used by the system that was not directly challenge tested in order to verify *Cryptosporidium* removal capability. Production modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.
- (viii) If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the State.

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

- (i) The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.
- (ii) The direct integrity method must have a resolution of 3 micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.
- (iii) The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the State, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the approach in either paragraph (b)(3)(iii)(A) or (B) of this section as applicable to the type of direct integrity test the system uses.

- (A) For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation:

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

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.

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

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

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.

- (iv) Systems must establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the State.
- (v) If the result of a direct integrity test exceeds the control limit established under paragraph (b)(3)(iv) of this section, the system must remove the membrane unit from service. Systems must conduct a direct integrity test to verify any repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.
- (vi) Systems must conduct direct integrity testing on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation. The State may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium*, or reliable process safeguards.
- (4) **Indirect integrity monitoring.** Systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in paragraphs (b)(4)(i) through (v) of this section. Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in paragraphs (b)(3)(i) through (v) of this section is not subject to the requirements for continuous indirect integrity monitoring. Systems must submit a monthly report to the State summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.
- (i) Unless the State approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.
- (ii) Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.
- (iii) Continuous monitoring must be separately conducted on each membrane unit.
- (iv) If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (i.e., two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit as specified in paragraphs (b)(3)(i) through (v) of this section.



- (v) If indirect integrity monitoring includes a State-approved alternative parameter and if the alternative parameter exceeds a State-approved control limit for a period greater than 15 minutes, direct integrity testing must immediately be performed on the associated membrane units as specified in paragraphs (b)(3)(i) through (v) of this section.
- (c) **Second stage filtration.** Systems receive 0.5-log *Cryptosporidium* treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC, or other fine grain media following granular media filtration if the State approves. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat the entire plant flow taken from a surface water or GWUDI source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The State must approve the treatment credit based on an assessment of the design characteristics of the filtration process.
- (d) **Slow sand filtration (as secondary filter).** Systems are eligible to receive 2.5-log *Cryptosporidium* treatment credit for a slow sand filtration process that follows a separate stage of filtration if both filtration stages treat entire plant flow taken from a surface water or GWUDI source and no disinfectant residual is present in the influent water to the slow sand filtration process. The State must approve the treatment credit based on an assessment of the design characteristics of the filtration process. This paragraph does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.

[71 FR 769, Jan. 5, 2006; 71 FR 6136, Feb. 6, 2006]

## § 141.720 Inactivation toolbox components.

- (a) **Calculation of CT values.**
  - (1) CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems with treatment credit for chlorine dioxide or ozone under paragraph (b) or (c) of this section must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in §§ 141.74(a) through (b).
  - (2) Systems with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, systems must add the *Cryptosporidium* CT values in each segment to determine the total CT for the treatment plant.
- (b) **CT values for chlorine dioxide and ozone.**
  - (1) Systems receive the *Cryptosporidium* treatment credit listed in this table by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in paragraph (a) of this section.

CT VALUES (MG·MIN/L) FOR *CRYPTOSPORIDIUM* INACTIVATION BY CHLORINE DIOXIDE<sup>1</sup>

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

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

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

CT VALUES (MG·MIN/L) FOR *CRYPTOSPORIDIUM* INACTIVATION BY OZONE<sup>1</sup>

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

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

- (c) **Site-specific study.** The State may approve alternative chlorine dioxide or ozone CT values to those listed in paragraph (b) of this section on a site-specific basis. The State must base this approval on a site-specific study a system conducts that follows a State-approved protocol.
- (d) **Ultraviolet light.** Systems receive *Cryptosporidium*, *Giardia lamblia*, and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in paragraph (d)(1) of this section. Systems must validate and monitor UV reactors as described in paragraphs (d)(2) and (3) of this section to demonstrate that they are achieving a particular UV dose value for treatment credit.
- (1) **UV dose table.** The treatment credits listed in this table are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, systems must demonstrate an equivalent germicidal dose through reactor validation testing, as described in paragraph (d)(2) of this section. The UV dose values in this table are applicable only to post-filter applications of UV in filtered systems and to unfiltered systems.

**UV DOSE TABLE FOR *CRYPTOSPORIDIUM*, *GIARDIA LAMBLIA*, AND VIRUS  
INACTIVATION CREDIT**

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

- (2) **Reactor validation testing.** Systems must use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in paragraph (d)(1) of this section (*i.e.*, validated operating conditions). These operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status.
- (i) When determining validated operating conditions, systems must account for the following factors: UV absorbance of the water; lamp fouling and aging; measurement uncertainty of on-line sensors; UV dose distributions arising from the velocity profiles through the reactor; failure of UV lamps or other critical system components; and inlet and outlet piping or channel configurations of the UV reactor.
- (ii) Validation testing must include the following: Full scale testing of a reactor that conforms uniformly to the UV reactors used by the system and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

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

(3) **Reactor monitoring.**

- (i) Systems must monitor their UV reactors to determine if the reactors are operating within validated conditions, as determined under paragraph (d)(2) of this section. This monitoring must include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the State designates based on UV reactor operation. Systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol the State approves.
- (ii) To receive treatment credit for UV light, systems must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in paragraphs (d)(1) and (2) of this section. Systems must demonstrate compliance with this condition by the monitoring required under paragraph (d)(3)(i) of this section.

REPORTING AND RECORDKEEPING REQUIREMENTS

§ 141.721 Reporting requirements.

- (a) Systems must report sampling schedules under § 141.702 and source water monitoring results under § 141.706 unless they notify the State that they will not conduct source water monitoring due to meeting the criteria of § 141.701(d).
- (b) Systems must report the use of uncovered finished water storage facilities to the State as described in § 141.714.
- (c) Filtered systems must report their *Cryptosporidium* bin classification as described in § 141.710.
- (d) Unfiltered systems must report their mean source water *Cryptosporidium* level as described in § 141.712.
- (e) Systems must report disinfection profiles and benchmarks to the State as described in §§ 141.708 through 141.709 prior to making a significant change in disinfection practice.
- (f) Systems must report to the State in accordance with the following table for any microbial toolbox options used to comply with treatment requirements under § 141.711 or § 141.712. Alternatively, the State may approve a system to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.

MICROBIAL TOOLBOX REPORTING REQUIREMENTS

Toolbox option	Systems must submit the following information	On the following schedule
(1) Watershed control program (WCP)	(i) Notice of intention to develop a new or continue an existing watershed control program	No later than two years before the applicable treatment compliance date in § 141.713

Toolbox option	Systems must submit the following information	On the following schedule
	(ii) Watershed control plan	No later than one year before the applicable treatment compliance date in § 141.713.
	(iii) Annual watershed control program status report	Every 12 months, beginning one year after the applicable treatment compliance date in § 141.713.
	(iv) Watershed sanitary survey report	For community water systems, every three years beginning three years after the applicable treatment compliance date in § 141.713. For noncommunity water systems, every five years beginning five years after the applicable treatment compliance date in § 141.713.
(2) Alternative source/intake management	Verification that system has relocated the intake or adopted the intake withdrawal procedure reflected in monitoring results	No later than the applicable treatment compliance date in § 141.713.
(3) Presedimentation	Monthly verification of the following: (i) Continuous basin operation (ii) Treatment of 100% of the flow (iii) Continuous addition of a coagulant (iv) At least 0.5-log mean reduction of influent turbidity or compliance with alternative State-approved performance criteria	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(4) Two-stage lime softening	Monthly verification of the following: (i) Chemical addition and hardness precipitation occurred in two separate and sequential softening stages prior to filtration (ii) Both stages treated 100% of the plant flow	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(5) Bank filtration	(i) Initial demonstration of the following: (A) Unconsolidated, predominantly sandy aquifer (B) Setback distance of at least 25 ft. (0.5-log credit) or 50 ft. (1.0-log credit) (ii) If monthly average of daily max turbidity is greater than 1 NTU then system must report result and submit an assessment of the cause.	No later than the applicable treatment compliance date in § 141.713.  Report within 30 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(6) Combined	Monthly verification of combined filter	Monthly reporting within 10 days

Toolbox option	Systems must submit the following information	On the following schedule
filter performance	effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the 4 hour CFE measurements taken each month	following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(7) Individual filter performance	Monthly verification of the following: (i) Individual filter effluent (IFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter (ii) No individual filter greater than 0.3 NTU in two consecutive readings 15 minutes apart	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.]
(8) Demonstration of performance	(i) Results from testing following a State approved protocol (ii) As required by the State, monthly verification of operation within conditions of State approval for demonstration of performance credit	No later than the applicable treatment compliance date in § 141.713. Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(9) Bag filters and cartridge filters	(i) Demonstration that the following criteria are met: (A) Process meets the definition of bag or cartridge filtration; (B) Removal efficiency established through challenge testing that meets criteria in this subpart (ii) Monthly verification that 100% of plant flow was filtered	No later than the applicable treatment compliance date in § 141.713.  Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(10) Membrane filtration	(i) Results of verification testing demonstrating the following: (A) Removal efficiency established through challenge testing that meets criteria in this subpart; (B) Integrity test method and parameters, including resolution, sensitivity, test frequency, control limits, and associated baseline (ii) Monthly report summarizing the following: (A) All direct integrity tests above the control limit; (B) If applicable, any turbidity or alternative state-	No later than the applicable treatment compliance date in § 141.713.  Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in §



Toolbox option	Systems must submit the following information	On the following schedule
	approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken	141.713.
(11) Second stage filtration	Monthly verification that 100% of flow was filtered through both stages and that first stage was preceded by coagulation step	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(12) Slow sand filtration (as secondary filter)	Monthly verification that both a slow sand filter and a preceding separate stage of filtration treated 100% of flow from subpart H sources.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(13) Chlorine dioxide	Summary of CT values for each day as described in § 141.720.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(14) Ozone	Summary of CT values for each day as described in § 141.720.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.
(15) UV	(i) Validation test results demonstrating operating conditions that achieve required UV dose	No later than the applicable treatment compliance date in § 141.713.
	(ii) Monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose as specified in 141.720(d).	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713.

### § 141.722 Recordkeeping requirements.

- (a) Systems must keep results from the initial round of source water monitoring under § 141.701(a) and the second round of source water monitoring under § 141.701(b) until 3 years after bin classification under § 141.710 for filtered systems or determination of the mean *Cryptosporidium* level under § 141.710 for unfiltered systems for the particular round of monitoring.
- (b) Systems must keep any notification to the State that they will not conduct source water monitoring due to meeting the criteria of § 141.701(d) for 3 years.

- (c) Systems must keep the results of treatment monitoring associated with microbial toolbox options under §§ 141.716 through 141.720 and with uncovered finished water reservoirs under § 141.714, as applicable, for 3 years.

#### REQUIREMENTS FOR SANITARY SURVEYS PERFORMED BY EPA

### § 141.723 Requirements to respond to significant deficiencies identified in sanitary surveys performed by EPA.

- (a) A sanitary survey is an onsite review of the water source (identifying sources of contamination by using results of source water assessments where available), facilities, equipment, operation, maintenance, and monitoring compliance of a PWS to evaluate the adequacy of the PWS, its sources and operations, and the distribution of safe drinking water.
- (b) For the purposes of this section, a significant deficiency includes a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that EPA determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.
- (c) For sanitary surveys performed by EPA, systems must respond in writing to significant deficiencies identified in sanitary survey reports no later than 45 days after receipt of the report, indicating how and on what schedule the system will address significant deficiencies noted in the survey.
- (d) Systems must correct significant deficiencies identified in sanitary survey reports according to the schedule approved by EPA, or if there is no approved schedule, according to the schedule reported under paragraph (c) of this section if such deficiencies are within the control of the system.

### Subpart X—Aircraft Drinking Water Rule

**Source:** 74 FR 53618, Oct. 19, 2009, unless otherwise noted.

### § 141.800 Applicability and compliance date.

- (a) **Applicability.** The requirements of this subpart constitute the National Primary Drinking Water Regulations for aircraft that are public water systems and that board only finished water for human consumption. Aircraft public water systems are considered transient non-community water systems (TNCWS). To the extent there is a conflict between the requirements in this subpart and the regulatory requirements established elsewhere in this part, this subpart governs.
- (b) **Compliance date.** Aircraft public water systems must comply, unless otherwise noted, with the requirements of this subpart beginning October 19, 2011. Until this compliance date, air carriers remain subject to existing national primary drinking water regulations.

### § 141.801 Definitions.

As used in this subpart, the term:

**Administrator** means the Administrator of the United States Environmental Protection Agency or his/her authorized representative.

**Air carrier** means a person who undertakes directly by lease, or other arrangement, to engage in air transportation. The air carrier is responsible for ensuring all of the aircraft it owns or operates that are public water systems comply with all provisions of this subpart.

**Aircraft** means a device that is used or intended to be used for flight in the air.

**Aircraft water system** means an aircraft that qualifies as a public water system under the Safe Drinking Water Act and the national primary drinking water regulations. The components of an aircraft water system include the water service panel, the filler neck of the aircraft finished water storage tank, and all finished water storage tanks, piping, treatment equipment, and plumbing fixtures within the aircraft that supply water for human consumption to passengers or crew.

**Aircraft water system operations and maintenance plan** means the schedules and procedures for operating, monitoring, and maintaining an aircraft water system that is included in an aircraft operation and maintenance program accepted by the Federal Aviation Administration. (14 CFR part 43, 14 CFR part 91, 14 CFR part 121)

**Finished water** means water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g., supplemental disinfection, addition of corrosion control chemicals). (40 CFR 141.2)

**Human consumption** means drinking, bathing, showering, hand washing, teeth brushing, food preparation, dishwashing, and maintaining oral hygiene.

**Self inspection** means an onsite review of the aircraft water system, including the water service panel, the filler neck of the aircraft finished water storage tank; all finished water storage tanks, piping, treatment equipment, and plumbing fixtures; and a review of the aircraft operations, maintenance, monitoring, and recordkeeping for the purpose of evaluating the adequacy of such water system components and practices for providing safe drinking water to passengers and crew.

**Watering point** means the water supply, methods, and facilities used for the delivery of finished water to the aircraft. These facilities may include water trucks, carts, cabinets, and hoses.

## § 141.802 Coliform sampling plan.

- (a) Each air carrier under this subpart must develop a coliform sampling plan covering each aircraft water system owned or operated by the air carrier that identifies the following:
  - (1) Coliform sample collection procedures that are consistent with the requirements of § 141.803(a) and (b).
  - (2) Sample tap location(s) representative of the aircraft water system as specified in § 141.803(b)(2) and (b)(4).
  - (3) Frequency and number of routine coliform samples to be collected as specified in § 141.803(b)(3).
  - (4) Frequency of routine disinfection and flushing as specified in the operations and maintenance plan under § 141.804.
  - (5) Procedures for communicating sample results promptly so that any required actions, including repeat and follow-up sampling, corrective action, and notification of passengers and crew, will be conducted in a timely manner.

- (b) Each air carrier must develop a coliform sampling plan for each aircraft with a water system meeting the definition of a public water system by April 19, 2011.
- (c) The coliform sampling plan must be included in the Aircraft Water System Operations and Maintenance Plan required in § 141.804. Any subsequent changes to the coliform sampling plan must also be included in the Aircraft Water System Operations and Maintenance Plan required in § 141.804.

### § 141.803 Coliform sampling.

- (a) **Analytical methodology.** Air carriers must follow the sampling and analysis requirements under this section.
  - (1) The standard sample volume required for total coliform analysis, regardless of analytical method used, is 100 mL.
  - (2) Air carriers need determine only the presence or absence of total coliforms and/or *E. coli*; a determination of density of these organisms is not required.
  - (3) Air carriers must conduct analyses for total coliform and *E. coli* in accordance with the analytical methods approved in § 141.21(f)(3) and 141.21(f)(6)) until March 31, 2016, and in accordance with the analytical methods approved in § 141.852 beginning April 1, 2016.
  - (4) The time from sample collection to initiation of analysis may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10 °C during transit.
  - (5) The invalidation of a total coliform sample result can be made only by the Administrator in accordance with § 141.21(c)(1)(i), (ii), or (iii) or by the certified laboratory in accordance with § 141.21(c)(2) until March 31, 2016, or in accordance with § 141.853(c) beginning April 1, 2016, with the Administrator acting as the State.
  - (6) **Certified laboratories.** For the purpose of determining compliance with this subpart, samples may be considered only if they have been analyzed by a laboratory certified by a State or EPA. For the purposes of this paragraph, "State" refers to a State or Tribe that has received primacy for public water systems (other than aircraft water systems) under section 1413 of SDWA.
- (b) **Routine monitoring.** For each aircraft water system, the sampling frequency must be determined by the disinfection and flushing frequency recommended by the aircraft water system manufacturer, when available, and as identified in the operations and maintenance plan in § 141.804.
  - (1) Except as provided in paragraph (b)(2) of this section, the air carrier must collect two 100 mL total coliform routine samples at the frequency specified in the sampling plan in § 141.802 and in accordance with paragraph (b)(3) of this section;
  - (2) The air carrier may collect one 100 mL total coliform routine sample at the frequency specified in the sampling plan in § 141.802 for aircraft with a removable or portable tank that is drained every day of passenger service, and the aircraft has only one tap. Aircraft meeting the requirements of this paragraph do not have to comply with paragraph (b)(4) of this section.
  - (3) Air carriers must perform routine monitoring for total coliform at a frequency corresponding to the frequency of routine disinfection and flushing as specified in the Table b-1 (Routine Disinfection and Flushing and Routine Sample Frequencies). Air carriers must follow the disinfection and flushing frequency recommended by the aircraft water system manufacturer, when available. Where the

aircraft water system manufacturer does not specify a recommended routine disinfection and flushing frequency, the air carrier must choose a frequency from Table b-1 (Routine Disinfection and Flushing and Routine Sample Frequencies):

**TABLE B-1—ROUTINE DISINFECTION AND FLUSHING AND ROUTINE SAMPLE FREQUENCIES**

Minimum routine disinfection & flushing per aircraft	Minimum frequency of routine samples per aircraft
At least 4 times per year = At least once within every three-month period (quarterly)	At least 1 time per year = At least once within every twelve-month period (annually).
At least 3 times per year = At least once within every four-month period	At least 2 times per year = At least once within every six-month period (semi-annually).
At least 2 times per year = At least once within every six-month period (semi-annually)	At least 4 times per year = At least once within every three-month period (quarterly).
At least 1 time per year or less = At least once within every twelve-month period (annually) or less	At least 12 times per year = At least once every month (monthly).

(4) One sample must be taken from a lavatory and one from a galley; each sample must be analyzed for total coliform. If only one water tap is located in the aircraft water system due to aircraft model type and construction, then a single tap may be used to collect two separate 100 mL samples.

(5) If any routine, repeat, or follow-up coliform sample is total coliform-positive, the air carrier must analyze that total coliform-positive culture medium to determine if *E. coli* is present.

(6) Routine total coliform samples must not be collected within 72 hours after completing routine disinfection and flushing procedures.

(c) **Routine coliform sample results —**

(1) **Negative routine coliform sample results.** If all routine sample results are total coliform-negative, then the air carrier must maintain the routine monitoring frequency for total coliform as specified in the sampling plan in § 141.802.

(2) **Positive routine *E. coli* sample results.** If any routine sample is *E. coli*-positive, the air carrier must perform all of the following:

(i) **Restrict public access.** Restrict public access to the aircraft water system in accordance with paragraph (d) of this section as expeditiously as possible, but in no case later than 24 hours after the laboratory notifies the air carrier of the *E. coli*-positive result or discovery of the applicable failure as specified in paragraphs (g) and (h) of this section. All public access restrictions, including applicable public notification requirements, must remain in-place until the aircraft water system has been disinfected and flushed and a complete set of follow-up samples is total coliform-negative; and

- (ii) **Disinfect and flush.** Conduct disinfection and flushing in accordance with § 141.804(b)(2). If the aircraft water system cannot be physically disconnected or shut-off, or the flow of water otherwise prevented through the tap(s), then the air carrier must disinfect and flush the system no later than 72 hours after the laboratory notifies the air carrier of the *E. coli*-positive result or discovery of the applicable failure as specified in paragraphs (g) and (h) of this section; and
  - (iii) **Follow-up sampling.** Collect follow-up samples in accordance with paragraph (e) of this section. A complete set of follow-up sample results must be total coliform-negative before the air carrier provides water for human consumption from the aircraft water system and returns to the routine monitoring frequency as specified in the sampling plan required by § 141.802.
- (3) **Positive routine total coliform sample results.** If any routine sample is total coliform-positive and *E. coli*-negative, then the air carrier must perform at least one of the following three corrective actions and continue through with that action until a complete set of follow-up or repeat samples is total coliform-negative:
  - (i) **Disinfect and flush.** In accordance with § 141.804(b)(2), conduct disinfection and flushing of the system no later than 72 hours after the laboratory notifies the air carrier of the total coliform-positive and *E. coli*-negative result. After disinfection and flushing is completed, the air carrier must collect follow-up samples in accordance with paragraph (e) of this section prior to providing water for human consumption from the aircraft water system. A complete set of follow-up sample results must be total coliform-negative before the air carrier returns to the routine monitoring frequency as specified in the sampling plan required by § 141.802; or
  - (ii) **Restrict public access.** In accordance with paragraph (d) of this section, restrict public access to the aircraft water system as expeditiously as possible, but in no case later than 72 hours after the laboratory notifies the air carrier of the total coliform-positive and *E. coli*-negative result or discovery of the applicable failure as specified in paragraphs (f), (g), and, (i) of this section. All public access restrictions, including applicable public notification requirements, must remain in-place until the aircraft water system has been disinfected and flushed, and a complete set of follow-up samples has been collected. The air carrier must conduct disinfection and flushing in accordance with § 141.804(b)(2). After disinfection and flushing is completed, the air carrier must collect follow-up samples in accordance with paragraph (e) of this section prior to providing water for human consumption from the aircraft water system. A complete set of follow-up sample results must be total coliform-negative before the air carrier returns to the routine monitoring frequency as specified in the sampling plan required by § 141.802; or
  - (iii) **Repeat sampling.** Collect three 100 mL repeat samples no later than 24 hours after the laboratory notifies the air carrier of the routine total coliform-positive and *E. coli*-negative result. Repeat samples must be collected and analyzed from three taps within the aircraft as follows: The tap which resulted in the total coliform-positive sample, one other lavatory tap, and one other galley tap. If fewer than three taps exist, then a total of three 100 mL samples must be collected and analyzed from the available taps within the aircraft water system.
    - (A) If all repeat samples are total coliform-negative, then the air carrier must maintain the routine monitoring frequency for total coliform as specified in the sampling plan in § 141.802.
    - (B) If any repeat sample is *E. coli*-positive, the air carrier must perform all the corrective actions as specified in paragraphs (c)(2)(i), (c)(2)(ii), and (c)(2)(iii) of this section.

- (C) If any repeat sample is total coliform-positive and *E. coli*-negative, then the air carrier must perform the corrective actions specified in paragraphs (c)(3)(i) or (c)(3)(ii) of this section, and continue through with that action until a complete set of follow-up samples is total coliform-negative.
- (d) **Restriction of public access.** Restriction of public access to the aircraft water system includes, but need not be limited to, the following:
  - (1) Physically disconnecting or shutting off the aircraft water system, where feasible, or otherwise preventing the flow of water through the tap(s);
  - (2) Providing public notification to passengers and crew in accordance with § 141.805.
  - (3) Providing alternatives to water from the aircraft water system, such as bottled water for drinking and coffee or tea preparation; antiseptic hand gels or wipes in accordance with 21 CFR part 333—“Topical Anti-microbial Drug Products for Over-the-Counter Human Use” in the galleys and lavatories; and other feasible measures that reduce or eliminate the need to use the aircraft water system during the limited period before public use of the aircraft water system is unrestricted.
- (e) **Post disinfection and flushing follow-up sampling.** Following corrective action disinfection and flushing, air carriers must comply with post disinfection and flushing follow-up sampling procedures that, at a minimum, consist of the following:
  - (1) For each aircraft water system, the air carrier must collect a complete set of total coliform follow-up samples consisting of two 100 mL total coliform samples at the same routine sample locations as identified in paragraphs (b)(2) and (b)(4) of this section.
  - (2) Follow-up samples must be collected prior to providing water to the public for human consumption from the aircraft water system.
  - (3) If a complete set of follow-up samples is total coliform-negative, the air carrier must return to the routine monitoring frequency for total coliform as specified in the sampling plan required by § 141.802.
  - (4) If any follow-up sample is *E. coli*-positive, the air carrier must perform all the corrective actions as specified in paragraphs (c)(2)(i), (c)(2)(ii), and (c)(2)(iii) of this section.
  - (5) If any follow-up sample is total coliform-positive and *E. coli*-negative the air carrier must restrict public access to the aircraft water system in accordance with paragraph (d) of this section as expeditiously as possible, but in no case later than 72 hours after the laboratory notifies the air carrier of the total coliform-positive and *E. coli*-negative result. All public access restrictions, including applicable public notification requirements, must remain in-place until the aircraft water system has been disinfected and flushed in accordance with § 141.804(b)(2) and a complete set of follow-up samples is total coliform-negative. The air carrier must collect follow-up samples in accordance with paragraph (e) of this section. A complete set of follow-up sample results must be total coliform-negative before the air carrier provides water for human consumption from the aircraft water system and returns to the routine monitoring frequency for coliform as specified in § 141.802.
- (f) **Failure to perform required routine disinfection and flushing or failure to collect required routine samples.** If the air carrier fails to perform routine disinfection and flushing or fails to collect and analyze the required number of routine coliform samples, the air carrier must perform all the corrective actions as specified in paragraph (c)(3)(ii) of this section.

- (g) **Failure to collect repeat or follow-up samples.** If the air carrier fails to collect and analyze the required follow-up samples as a result of an *E. coli*-positive result, then the air carrier must perform all the corrective actions as specified in paragraphs (c)(2)(i), (c)(2)(ii), and (c)(2)(iii) of this section. If the air carrier fails to collect and analyze the required repeat samples or follow-up samples as a result of a total coliform-positive and *E. coli*-negative result, then the air carrier must perform all the corrective actions as specified in paragraph (c)(3)(ii) of this section.
- (h) **Failure to board water from a safe watering point (*E. coli*-positive).** For the aircraft water system, the air carrier must perform all the corrective actions specified in paragraphs (c)(2)(i), (c)(2)(ii), and (c)(2)(iii) of this section when it becomes aware of an *E. coli*-positive event resulting from:
  - (1) Boarding water from a watering point not in accordance with FDA regulations (21 CFR part 1240 subpart E), or
  - (2) Boarding water that does not meet NPDWRs applicable to transient non-community water systems (§§ 141.62 and 141.63, as applied to TNCWS),
  - (3) Boarding water that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6).
- (i) **Failure to board water from a safe watering point (*non-E. coli*-positive).** For the aircraft water system, the air carrier must perform all the corrective actions specified in paragraphs (c)(3)(ii) of this section when it becomes aware of a *non-E. coli*-positive event resulting from:
  - (1) Boarding water from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E),
  - (2) Boarding water that does not meet NPDWRs applicable to transient non-community water systems (§§ 141.62 and 141.63, as applied to TNCWS), or
  - (3) Boarding water that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6).

[74 FR 53618, Oct. 19, 2009, as amended at 78 FR 10354, Feb. 13, 2013]

#### § 141.804 Aircraft water system operations and maintenance plan.

- (a) Each air carrier must develop and implement an aircraft water system operations and maintenance plan for each aircraft water system that it owns or operates. This plan must be included in a Federal Aviation Administration (FAA)-accepted air carrier operations and maintenance program (14 CFR part 43, 14 CFR part 91, 14 CFR part 121).
- (b) Each aircraft water system operations and maintenance plan must include the following:
  - (1) **Watering point selection requirement.** All watering points must be selected in accordance with Food and Drug Administration (FDA) regulations (21 CFR part 1240, subpart E).
  - (2) **Procedures for disinfection and flushing.** The plan must include the following requirements for procedures for disinfection and flushing of aircraft water system.
    - (i) The air carrier must conduct disinfection and flushing of the aircraft water system in accordance with, or is consistent with, the water system manufacturer's recommendations. The air carrier may conduct disinfection and flushing more frequently, but not less frequently, than the manufacturer recommends.



- (ii) The operations and maintenance plan must identify the disinfection frequency, type of disinfecting agent, disinfectant concentration to be used, and the disinfectant contact time, and flushing volume or flushing time.
    - (iii) In cases where a recommended routine disinfection and flushing frequency is not specified by the aircraft water system manufacturer, the air carrier must choose a disinfection and flushing, and corresponding monitoring frequency specified in § 141.803(b)(3).
  - (3) **Follow-up sampling.** The plan must include the procedures for follow-up sampling in accordance with § 141.803(e).
  - (4) **Training requirements.** Training for all personnel involved with the aircraft water system operation and maintenance provisions of this regulation must include, but is not limited to the following:
    - (i) Boarding water procedures;
    - (ii) Sample collection procedures;
    - (iii) Disinfection and flushing procedures;
    - (iv) Public health and safety reasons for the requirements of this subpart.
  - (5) **Procedures for conducting self-inspections of the aircraft water system.** Procedures must include, but are not limited to, inspection of storage tank, distribution system, supplemental treatment, fixtures, valves, and backflow prevention devices.
  - (6) **Procedures for boarding water.** The plan must include the following requirements and procedures for boarding water:
    - (i) Within the United States, the air carrier must board water from watering points in accordance with Food and Drug Administration (FDA) regulations (21 CFR part 1240, subpart E).
    - (ii) A description of how the water will be transferred from the watering point to the aircraft in a manner that ensures it will not become contaminated during the transfer.
    - (iii) A description of how the carrier will ensure that water boarded outside the United States is safe for human consumption.
    - (iv) A description of emergency procedures that meet the requirements in § 141.803(h) and (i) that must be used in the event that the air carrier becomes aware that water was boarded to operate essential systems, such as toilets, but was boarded from a watering point not in accordance with FDA regulations, does not meet NPDWRs applicable to transient non-community water systems (§§ 141.62 and 141.63, as applied to TNCWSs), or is otherwise unsafe.
  - (7) **Coliform sampling plan.** The air carrier must include the coliform sampling plan prepared in accordance with § 141.802.
  - (8) **Aircraft water system disconnect/shut-off, or prevent flow of water through the tap(s) statement.** An explanation of whether the aircraft water system can be physically disconnected/shut-off, or the flow of water otherwise prevented through the tap(s) to the crew and passengers.
- (c) For existing aircraft, the air carrier must develop the water system operations and maintenance plan required by this section by April 19, 2011;

- (d) For new aircraft, the air carrier must develop the operations and maintenance plan required in this section within the first calendar quarter of initial operation of the aircraft.
- (e) Any changes to the aircraft water system operations and maintenance plan must be included in the FAA-accepted air carrier operations and maintenance program.

### § 141.805 Notification to passengers and crew.

- (a) Air carriers must give public notice for each aircraft in all of the following situations:
  - (1) Public access to the aircraft water system is restricted in response to a routine, repeat or follow-up total coliform-positive or *E. coli*-positive sample result in accordance with § 141.803(d);
  - (2) Failure to perform required routine disinfection and flushing or failure to collect required routine samples in accordance with § 141.803(f);
  - (3) Failure to collect the required follow-up samples in response to a sample result that is *E. coli*-positive in accordance with § 141.803(g);
  - (4) Failure to collect the required repeat samples or failure to collect the required follow-up samples in response to a sample result that is total coliform-positive and *E. coli*-negative in accordance with § 141.803(g);
  - (5) In accordance with § 141.803(h), the air carrier becomes aware of an *E. coli*-positive event resulting from water that has been boarded from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E), or that does not meet NPDWRs applicable to transient non-community water systems, or that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6);
  - (6) In accordance with § 141.803(i), the air carrier becomes aware of a non-*E. coli*-positive event resulting from water that has been boarded from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E), or that does not meet NPDWRs applicable to transient non-community water systems, or that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6).
  - (7) The Administrator, the carrier, or the crew otherwise determines that notification is necessary to protect public health.
- (b) **Public notification:**
  - (1) Must be displayed in a conspicuous way when printed or posted;
  - (2) Must not contain overly technical language or very small print;
  - (3) Must not be formatted in a way that defeats the purpose of the notice;
  - (4) Must not contain language that nullifies the purpose of the notice;
  - (5) Must contain information in the appropriate language(s) regarding the importance of the notice, reflecting a good faith effort to reach the non-English speaking population served, including, where applicable, an easily recognized symbol for non-potable water.
- (c) Public notification for paragraph (a)(1) of this section must meet the requirements of paragraph (b) of this section in addition to the following:

- (1) Public notification must include a prominently displayed, clear statement in each lavatory indicating that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use; and
  - (2) A prominent notice in the galley directed at the crew which includes:
    - (i) A clear statement that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use;
    - (ii) A description of the violation or situation triggering the notice, including the contaminant(s) of concern;
    - (iii) When the violation or situation occurred;
    - (iv) Any potential adverse health effects from the violation or situation, as appropriate, under paragraph (g) of this section;
    - (v) The population at risk, including sensitive subpopulations particularly vulnerable if exposed to the contaminant in the drinking water;
    - (vi) What the air carrier is doing to correct the violation or situation; and
    - (vii) When the air carrier expects to return the system to unrestricted public access.
  - (3) If passenger access to the water system is physically prevented through disconnecting or shutting off the water, or the flow of water prevented through the tap(s), or if water is supplied only to lavatory toilets, and not to any lavatory or galley taps, then only the notice specified in paragraph (c)(2) of this section is required.
  - (4) Air carriers must initiate public notification when restriction of public access is initiated in accordance with § 141.803(d) and must continue until the aircraft water system is returned to unrestricted public access.
- (d) Public notification for paragraphs (a)(2), (a)(4), and (a)(6) of this section must meet the requirements of paragraph (b) of this section in addition to the following:
- (1) Public notification must include a prominently displayed, clear statement in each lavatory indicating that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use; and
  - (2) A prominent notice in the galley directed at the crew which includes:
    - (i) A clear statement that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use;
    - (ii) A clear statement that it is not known whether the water is contaminated because there was a failure to perform required routine disinfection and flushing; or a failure to perform required monitoring; or water was boarded from a watering point not in accordance with FDA regulations, or that does not meet NPDWRs applicable to transient noncommunity water systems, or that is otherwise determined to be unsafe due to noncompliance with the procedures specified in § 141.804(b)(6);
    - (iii) When and where the unsafe water was boarded or when the specific monitoring or disinfection and flushing requirement was not met;

- (iv) Any potential adverse health effects from exposure to waterborne pathogens that might be in the water, as appropriate, under paragraph (g) of this section;
  - (v) The population at risk, including sensitive subpopulations particularly vulnerable if exposed to the contaminant in the drinking water; and
  - (vi) A statement indicating when the system will be disinfected and flushed and returned to unrestricted public access.
- (3) If passenger access to the water system is physically prevented through disconnecting or shutting off the water, or the flow of water prevented through the tap(s), or if water is supplied only to lavatory toilets, and not to any lavatory or galley taps, then only the notice specified in paragraph (d)(2) of this section is required.
- (4) Air carriers must initiate public notification when restriction of public access is initiated in accordance with § 141.803(d) and must continue until the aircraft water system is returned to unrestricted public access.
- (e) Public notification for paragraphs (a)(3) and (a)(5) of this section must meet the requirements of paragraph (b) of this section in addition to the following:
- (1) Public notification must include a prominently displayed, clear statement in each lavatory indicating that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use; and
  - (2) A prominent notice in the galley directed at the crew which includes:
    - (i) A clear statement that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use;
    - (ii) A clear statement that the water is contaminated and there was a failure to conduct required monitoring; or a clear statement that water is contaminated because water was boarded from a watering point not in accordance with FDA regulations, or that does not meet NPDWRs applicable to transient noncommunity water systems, or that is otherwise determined to be unsafe due to noncompliance with the procedures specified in § 141.804(b)(6);
    - (iii) A description of the contaminant(s) of concern;
    - (iv) When and where the unsafe water was boarded or when the specific monitoring requirement was not met;
    - (v) Any potential adverse health effects from the situation, as appropriate, under paragraph (g) of this section;
    - (vi) The population at risk, including sensitive subpopulations particularly vulnerable if exposed to the contaminant in the drinking water;
    - (vii) A statement indicating what the air carrier is doing to correct the situation; and
    - (viii) When the air carrier expects to return the system to unrestricted public access.
- (3) If passenger access to the water system is physically prevented through disconnecting or shutting off the water, or the flow of water prevented through the tap(s), or if water is supplied only to lavatory toilets, and not to any lavatory or galley taps, then only the notice specified in paragraph (e)(2) of this section is required.

- (4) Air carriers must initiate public notification when restriction of public access is initiated in accordance with § 141.803(d) and must continue public notification until a complete set of required follow-up samples are total coliform-negative.
- (f) Public notification for paragraph (a)(7) of this section must meet the requirements of paragraph (b) of this section in addition to the following:
  - (1) Notification must be in a form and manner reasonably calculated to reach all passengers and crew while on board the aircraft by using one or more of the following forms of delivery:
    - (i) Broadcast over public announcement system on aircraft;
    - (ii) Posting of the notice in conspicuous locations throughout the area served by the water system. These locations would normally be the galleys and in the lavatories of each aircraft requiring posting;
    - (iii) Hand delivery of the notice to passengers and crew;
    - (iv) Another delivery method approved in writing by the Administrator.
  - (2) Air carriers must initiate public notification within 24 hours of being informed by EPA to perform notification and must continue notification for the duration determined by EPA.
- (g) In each public notice to the crew, air carriers must use the following standard health effects language that corresponds to the situations in paragraphs (a)(1) through (a)(6) of this section.
  - (1) Health effects language to be used when public notice is initiated due to the detection of total coliforms only (not *E. coli*) in accordance with paragraph (a)(1) of this section:

Coliform are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Coliforms were found in [INSERT NUMBER OF SAMPLES DETECTED] samples collected and this is a warning of potential problems. If human pathogens are present, they can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

- (2) Health effects language to be used when public notice is initiated due to any *E. coli*-positive routine, repeat, or follow-up sample in accordance with paragraph (a)(1) of this section:

*E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

- (3) Health effects language to be used when public notice is initiated due to a failure to conduct routine monitoring or routine disinfection and flushing in accordance with paragraph (a)(2) of this section; or when there is a failure to conduct repeat or follow-up sampling in accordance with paragraph (a)(4) of this section; or in accordance with paragraph (a)(6) of this section, when the air carrier becomes aware of a non-*E. coli*-positive event that is the result of water that was boarded from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E), or that does not meet NPDWRs applicable to transient non-community water systems, or that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6):

Because [REQUIRED MONITORING AND ANALYSIS WAS NOT CONDUCTED], [REQUIRED DISINFECTION AND FLUSHING WAS NOT CONDUCTED] [WATER WAS BOARDED FROM A WATERING POINT NOT IN ACCORDANCE WITH FDA REGULATIONS (21 CR 1240 SUBPART E)], or [OTHER APPROPRIATE EXPLANATION], we cannot be sure of the quality of the drinking water at this time. However, drinking water contaminated with human pathogens can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

- (4) Health effects language to be used when public notice is initiated due to a failure to conduct required follow-up monitoring in response to a sample result that is *E. coli*-positive in accordance with paragraph (a)(3) of this section; or in accordance with paragraph (a)(5) of this section, when the air carrier becomes aware of an *E. coli*-positive event that is the result of water that was boarded from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E), or that does not meet NPDWRs applicable to transient non-community water systems, or that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6):

Because required follow-up monitoring and analysis was not conducted after the aircraft water system tested positive for *E. coli*, we cannot be sure of the quality of the drinking water at this time. *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

OR

Water was boarded that is contaminated with *E. coli* because [WATER WAS BOARDED FROM A WATERING POINT NOT IN ACCORDANCE WITH FDA REGULATIONS (21 CR 1240 SUBPART E)], or [OTHER APPROPRIATE EXPLANATION]. *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

## § 141.806 Reporting requirements.

- (a) The air carrier must comply with the following requirements regarding reporting of the development of the coliform sampling plan, the operations and maintenance plan, and the disinfection and flushing and coliform sampling frequencies.
- (1) The air carrier must report to the Administrator that it has developed the coliform sampling plan required by § 141.802, which covers each existing aircraft water system, as well as report the frequency for routine coliform sampling identified in the coliform sampling plan by April 19, 2011. The air carrier must report to the Administrator that it has developed its operations and maintenance plan required by § 141.804 and report the frequency for routine disinfection and flushing by April 19, 2011;
- (2) For each new aircraft meeting the definition of an aircraft water system, which becomes operational after publication of this subpart, the air carrier must report to the Administrator that it has developed the coliform sampling plan required by § 141.802, as well as report the frequency for routine coliform sampling identified in the coliform sampling plan, within the first calendar quarter of initial

operation of the aircraft. The air carrier must report to the Administrator that it has developed the aircraft water system operations and maintenance plan required by § 141.804, and report the frequency for routine disinfection and flushing within the first calendar quarter of initial operation of the aircraft.

(b) The air carrier must report the following information to the Administrator:

- (1) A complete inventory of aircraft that are public water systems by April 19, 2011. Inventory information includes, at a minimum, the following:
  - (i) The unique aircraft identifier number;
  - (ii) The status (active or inactive) of any aircraft as an aircraft water system as defined in § 141.801;
  - (iii) The type and location of any supplemental treatment equipment installed on the water system; and
  - (iv) Whether the aircraft water system can be physically disconnected or shut-off, or the flow of water prevented through the tap(s).
- (2) Changes in aircraft inventory no later than 10 days following the calendar month in which the change occurred. Changes in inventory information include, at a minimum, the following:
  - (i) Change in the unique identifier number for any new aircraft, or any aircraft removed from the carrier's fleet;
  - (ii) Change in status (active or inactive) of any aircraft as an aircraft water system as defined in § 141.801; and
  - (iii) Change to the type and location of any supplemental treatment equipment added to or removed from the water system.
  - (iv) Change to whether the aircraft water system can be physically disconnected or shut-off, or the flow of water prevented through the tap(s).
- (3) All sampling results no later than 10 calendar days following the monitoring period in which the sampling occurred. The monitoring period is based on the monitoring frequency identified in the coliform sampling plan required under § 141.802. Routine disinfection and flushing events must be reported no later than 10 calendar days following the disinfection and flushing period in which the disinfection and flushing occurred. The disinfection and flushing period is based on the frequency identified in the operations and maintenance plan required under § 141.804.
- (4) All events requiring notification to passengers or crew, or non-routine disinfection and flushing, or non-routine sampling, within 10 days of the event (e.g., notification of positive sample result by laboratory), including information on whether required notification was provided to passengers or crew or both.
- (5) Failure to comply with the monitoring or disinfection and flushing requirements of this subpart within 10 calendar days of discovery of the failure.

- (6) Changes in disinfection and flushing and coliform sampling frequencies no later than 10 days following the calendar month in which the change occurred. Changes to an aircraft's routine coliform sampling frequency and routine disinfection and flushing frequency must be included in the aircraft water system operation and maintenance plan that is included in the air carrier operations and maintenance program accepted by FAA in accordance with § 141.804.
- (c) The air carrier must provide evidence of a self-inspection to the Administrator within 90 days of completion of the self-inspection required under § 141.808(b), including reporting whether all deficiencies were addressed in accordance with § 141.808(c). The air carrier must also report to the Administrator within 90 days that any deficiency identified during a compliance audit conducted in accordance with § 141.808(a) has been addressed. If any deficiency has not been addressed within 90 days of identification of the deficiency, the report must also include a description of the deficiency, an explanation as to why it has not yet been addressed, and a schedule for addressing it as expeditiously as possible.
- (d) All information required to be reported to the Administrator under this subpart must be in an electronic format established or approved by the Administrator. If an air carrier is unable to report electronically, the air carrier may use an alternative approach that the Administrator approves.

### § 141.807 Recordkeeping requirements.

- (a) The air carrier must keep records of bacteriological analyses for at least 5 years and must include the following information:
  - (1) The date, time, and place of sampling, and the name of the person who collected the sample;
  - (2) Identification of the sample as a routine, repeat, follow-up, or other special purpose sample;
  - (3) Date of the analysis;
  - (4) Laboratory and person responsible for performing the analysis;
  - (5) The analytical technique/method used; and
  - (6) The results of the analysis.
- (b) The air carrier must keep records of any disinfection and flushing for at least 5 years and must include the following information:
  - (1) The date and time of the disinfection and flushing; and
  - (2) The type of disinfection and flushing (*i.e.*, routine or corrective action).
- (c) The air carrier must keep records of a self-inspection for at least 10 years and must include the following information:
  - (1) The completion date of the self-inspection; and
  - (2) Copies of any written reports, summaries, or communications related to the self-inspection.
- (d) The air carrier must maintain sampling plans and make such plans available for review by the Administrator upon request, including during compliance audits.
- (e) The air carrier must maintain aircraft water system operations and maintenance plans in accordance with FAA requirements, and make such plans available for review by the Administrator upon request, including during compliance audits.



- (f) The air carrier must keep copies of public notices to passengers and crew issued as required by this subpart for at least 3 years after issuance.

#### § 141.808 Audits and inspections.

- (a) The Administrator may conduct routine compliance audits as deemed necessary in providing regulatory oversight to ensure proper implementation of the requirements in this subpart. Compliance audits may include, but are not limited to:
  - (1) Bacteriological sampling of aircraft water system;
  - (2) Reviews and audits of records as they pertain to water system operations and maintenance such as log entries, disinfection and flushing procedures, and sampling results; and
  - (3) Observation of procedures involving the handling of finished water, watering point selection, boarding of water, operation, disinfection and flushing, and general maintenance and self-inspections of aircraft water system.
- (b) Air carriers or their representatives must perform a self-inspection of all water system components for each aircraft water system no less frequently than once every 5 years.
- (c) The air carrier must address any deficiency identified during compliance audits or routine self-inspections within 90 days of identification of the deficiency, or where such deficiency is identified during extended or heavy maintenance, before the aircraft is put back into service. This includes any deficiency in the water system's design, construction, operation, maintenance, or administration, as well as any failure or malfunction of any system component that has the potential to cause an unacceptable risk to health or that could affect the reliable delivery of safe drinking water.

#### § 141.809 Supplemental treatment.

- (a) Any supplemental drinking water treatment units installed onboard existing or new aircraft must be acceptable to FAA and FDA; and must be installed, operated, and maintained in accordance with the manufacturer's plans and specifications and FAA requirements.
- (b) Water supplemental treatment and production equipment must produce water that meets the standards prescribed in this part.

#### § 141.810 Violations.

An air carrier is in violation of this subpart when, for any aircraft water system it owns or operates, any of the following occur:

- (a) It fails to perform any of the requirements in accordance with § 141.803 or § 141.804.
- (b) It has an *E. coli*-positive sample in any monitoring period (routine and repeat samples are used in this determination).
- (c) It fails to provide notification to passengers and crew in accordance with § 141.805.
- (d) It fails to comply with the reporting and recordkeeping requirements of this subpart.
- (e) It fails to conduct a self-inspection or address a deficiency in accordance with § 141.808.

- (f) It fails to develop a coliform sampling plan in accordance with § 141.802, or fails to have and follow an operations and maintenance plan, which is included in a FAA accepted program in accordance with § 141.804.

## Subpart Y—Revised Total Coliform Rule

**Source:** 78 FR 10354, Feb. 13, 2013, unless otherwise noted.

### § 141.851 General.

- (a) **General.** The provisions of this subpart include both maximum contaminant level and treatment technique requirements.
- (b) **Applicability.** The provisions of this subpart apply to all public water systems.
- (c) **Compliance date.** Systems must comply with the provisions of this subpart beginning April 1, 2016, unless otherwise specified in this subpart.
- (d) **Implementation with EPA as State.** Systems falling under direct oversight of EPA, where EPA acts as the State, must comply with decisions made by EPA for implementation of subpart Y. EPA has authority to establish such procedures and criteria as are necessary to implement subpart Y.
- (e) **Violations of national primary drinking water regulations.** Failure to comply with the applicable requirements of §§ 141.851 through 141.861, including requirements established by the State pursuant to these provisions, is a violation of the national primary drinking water regulations under subpart Y.

### § 141.852 Analytical methods and laboratory certification.

- (a) **Analytical methodology.**
  - (1) The standard sample volume required for analysis, regardless of analytical method used, is 100 ml.
  - (2) Systems need only determine the presence or absence of total coliforms and *E. coli*; a determination of density is not required.
  - (3) The time from sample collection to initiation of test medium incubation may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10 deg. C during transit.
  - (4) If water having residual chlorine (measured as free, combined, or total chlorine) is to be analyzed, sufficient sodium thiosulfate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) must be added to the sample bottle before sterilization to neutralize any residual chlorine in the water sample. Dechlorination procedures are addressed in Section 9060A.2 of *Standard Methods for the Examination of Water and Wastewater* (20th and 21st editions).

- (5) Systems must conduct total coliform and *E. coli* analyses in accordance with one of the analytical methods in the following table or one of the alternative methods listed in Appendix A to subpart C of part 141.

Organism	Methodology category	Method <sup>1</sup>	Citation <sup>1</sup>
Total Coliforms	Lactose Fermentation Methods	Standard Total Coliform Fermentation Technique	Standard Methods 9221 B.1, B.2 (20th ed.; 21st ed.). <sup>2,3</sup> Standard Methods Online 9221 B.1, B.2-99. <sup>2,3</sup>
		Presence-Absence (P-A) Coliform Test	Standard Methods 9221 D.1, D.2 (20th ed.; 21st ed.). <sup>2,7</sup> Standard Methods Online

<sup>1</sup> The procedures must be done in accordance with the documents listed in paragraph (c) of this section. For Standard Methods, either editions, 20th (1998) or 21st (2005), may be used. For the Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions that may be used. For vendor methods, the date of the method listed in paragraph (c) of this section is the date/version of the approved method. The methods listed are the only versions that may be used for compliance with this rule. Laboratories should be careful to use only the approved versions of the methods, as product package inserts may not be the same as the approved versions of the methods.

<sup>2</sup> Incorporated by reference. See paragraph (c) of this section.

<sup>3</sup> Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between lactose broth and lauryl tryptose broth using the water normally tested, and if the findings from this comparison demonstrate that the false-positive rate and false-negative rate for total coliforms, using lactose broth, is less than 10 percent.

<sup>4</sup> All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series. Alternatively, membrane filtration equipment that is pre-sterilized by the manufacturer (i.e., disposable funnel units) may be used.

<sup>5</sup> Multiple-tube and multi-well enumerative formats for this method are approved for use in presence-absence determination under this regulation.

<sup>6</sup> Colisure® results may be read after an incubation time of 24 hours.

<sup>7</sup> A multiple tube enumerative format, as described in Standard Methods for the Examination of Water and Wastewater 9221, is approved for this method for use in presence-absence determination under this regulation.

<sup>8</sup> The following changes must be made to the EC broth with MUG (EC-MUG) formulation: Potassium dihydrogen phosphate,  $KH_2PO_4$ , must be 1.5g, and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

Organism	Methodology category	Method <sup>1</sup>	Citation <sup>1</sup>
	Membrane Filtration Methods	Standard Total Coliform Membrane Filter Procedure	9221 D.1, D.2-99. <sup>2 7</sup> Standard Methods 9222 B, C (20th ed.; 21st ed.). <sup>2 4</sup> Standard Methods Online 9222 B-97 <sup>2 4</sup> , 9222 C-97. <sup>2 4</sup>
		Membrane Filtration using MI medium m-ColiBlue24® Test <sup>2 4</sup> Chromocult <sup>2 4</sup>	EPA Method 1604. <sup>2</sup>
	Enzyme Substrate Methods	Colilert®	Standard Methods 9223 B (20th ed.; 21st ed.). <sup>2 5</sup> Standard Methods Online 9223 B-97. <sup>2 5</sup>

<sup>1</sup> The procedures must be done in accordance with the documents listed in paragraph (c) of this section. For Standard Methods, either editions, 20th (1998) or 21st (2005), may be used. For the Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions that may be used. For vendor methods, the date of the method listed in paragraph (c) of this section is the date/version of the approved method. The methods listed are the only versions that may be used for compliance with this rule. Laboratories should be careful to use only the approved versions of the methods, as product package inserts may not be the same as the approved versions of the methods.

<sup>2</sup> Incorporated by reference. See paragraph (c) of this section.

<sup>3</sup> Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between lactose broth and lauryl tryptose broth using the water normally tested, and if the findings from this comparison demonstrate that the false-positive rate and false-negative rate for total coliforms, using lactose broth, is less than 10 percent.

<sup>4</sup> All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series. Alternatively, membrane filtration equipment that is pre-sterilized by the manufacturer (i.e., disposable funnel units) may be used.

<sup>5</sup> Multiple-tube and multi-well enumerative formats for this method are approved for use in presence-absence determination under this regulation.

<sup>6</sup> Colisure® results may be read after an incubation time of 24 hours.

<sup>7</sup> A multiple tube enumerative format, as described in Standard Methods for the Examination of Water and Wastewater 9221, is approved for this method for use in presence-absence determination under this regulation.

<sup>8</sup> The following changes must be made to the EC broth with MUG (EC-MUG) formulation: Potassium dihydrogen phosphate, KH<sub>2</sub>PO<sub>4</sub>, must be 1.5g, and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

Organism	Methodology category	Method <sup>1</sup>	Citation <sup>1</sup>
<i>Escherichia coli</i>		Colisure®	Standard Methods 9223 B (20th ed.; 21st ed.). <sup>2 5 6</sup> Standard Methods Online 9223 B-97. <sup>2 5 6</sup>
		E*Colite® Test <sup>2</sup> Readycult® Test <sup>2</sup> modified Colitag® Test <sup>2</sup>	
	<i>Escherichia coli</i> Procedure (following Lactose Fermentation Methods)	EC-MUG medium	Standard Methods 9221 F.1 (20th ed.; 21st ed.). <sup>2</sup>
	<i>Escherichia coli</i> Partition Method	EC broth with MUG (EC-MUG)	Standard Methods 9222 G.1c(2) (20th ed.; 21st ed.). <sup>2 8</sup>

<sup>1</sup> The procedures must be done in accordance with the documents listed in paragraph (c) of this section. For Standard Methods, either editions, 20th (1998) or 21st (2005), may be used. For the Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions that may be used. For vendor methods, the date of the method listed in paragraph (c) of this section is the date/version of the approved method. The methods listed are the only versions that may be used for compliance with this rule. Laboratories should be careful to use only the approved versions of the methods, as product package inserts may not be the same as the approved versions of the methods.

<sup>2</sup> Incorporated by reference. See paragraph (c) of this section.

<sup>3</sup> Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between lactose broth and lauryl tryptose broth using the water normally tested, and if the findings from this comparison demonstrate that the false-positive rate and false-negative rate for total coliforms, using lactose broth, is less than 10 percent.

<sup>4</sup> All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series. Alternatively, membrane filtration equipment that is pre-sterilized by the manufacturer (i.e., disposable funnel units) may be used.

<sup>5</sup> Multiple-tube and multi-well enumerative formats for this method are approved for use in presence-absence determination under this regulation.

<sup>6</sup> Colisure® results may be read after an incubation time of 24 hours.

<sup>7</sup> A multiple tube enumerative format, as described in Standard Methods for the Examination of Water and Wastewater 9221, is approved for this method for use in presence-absence determination under this regulation.

<sup>8</sup> The following changes must be made to the EC broth with MUG (EC-MUG) formulation: Potassium dihydrogen phosphate,  $KH_2PO_4$ , must be 1.5g, and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

Organism	Methodology category	Method <sup>1</sup>	Citation <sup>1</sup>
		NA-MUG medium	Standard Methods 9222 G.1c(1) (20th ed.; 21st ed.) <sup>2</sup>
	Membrane Filtration Methods	Membrane Filtration using MI medium m-ColiBlue24® Test <sup>2 4</sup>	EPA Method 1604 <sup>2</sup>
	Enzyme Substrate Methods	Chromocult <sup>2 4</sup>	
		Colilert®	Standard Methods 9223 B (20th ed.; 21st ed.) <sup>2 5</sup>
			Standard Methods Online 9223 B-97 <sup>2 5 6</sup>
		Colisure®	Standard Methods 9223 B (20th ed.; 21st ed.) <sup>2 5 6</sup>
			Standard Methods Online 9223 B-97 <sup>2 5 6</sup>

<sup>1</sup> The procedures must be done in accordance with the documents listed in paragraph (c) of this section. For Standard Methods, either editions, 20th (1998) or 21st (2005), may be used. For the Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions that may be used. For vendor methods, the date of the method listed in paragraph (c) of this section is the date/version of the approved method. The methods listed are the only versions that may be used for compliance with this rule. Laboratories should be careful to use only the approved versions of the methods, as product package inserts may not be the same as the approved versions of the methods.

<sup>2</sup> Incorporated by reference. See paragraph (c) of this section.

<sup>3</sup> Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between lactose broth and lauryl tryptose broth using the water normally tested, and if the findings from this comparison demonstrate that the false-positive rate and false-negative rate for total coliforms, using lactose broth, is less than 10 percent.

<sup>4</sup> All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series. Alternatively, membrane filtration equipment that is pre-sterilized by the manufacturer (i.e., disposable funnel units) may be used.

<sup>5</sup> Multiple-tube and multi-well enumerative formats for this method are approved for use in presence-absence determination under this regulation.

<sup>6</sup> Colisure® results may be read after an incubation time of 24 hours.

<sup>7</sup> A multiple tube enumerative format, as described in Standard Methods for the Examination of Water and Wastewater 9221, is approved for this method for use in presence-absence determination under this regulation.

<sup>8</sup> The following changes must be made to the EC broth with MUG (EC-MUG) formulation: Potassium dihydrogen phosphate, KH<sub>2</sub>PO<sub>4</sub>, must be 1.5g, and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

Organism	Methodology category	Method <sup>1</sup>	Citation <sup>1</sup>
		E*Colite® Test <sup>2</sup> Readycult® Test <sup>2</sup> modified Colitag® Test <sup>2</sup>	

<sup>1</sup> The procedures must be done in accordance with the documents listed in paragraph (c) of this section. For Standard Methods, either editions, 20th (1998) or 21st (2005), may be used. For the Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions that may be used. For vendor methods, the date of the method listed in paragraph (c) of this section is the date/version of the approved method. The methods listed are the only versions that may be used for compliance with this rule. Laboratories should be careful to use only the approved versions of the methods, as product package inserts may not be the same as the approved versions of the methods.

<sup>2</sup> Incorporated by reference. See paragraph (c) of this section.

<sup>3</sup> Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between lactose broth and lauryl tryptose broth using the water normally tested, and if the findings from this comparison demonstrate that the false-positive rate and false-negative rate for total coliforms, using lactose broth, is less than 10 percent.

<sup>4</sup> All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series. Alternatively, membrane filtration equipment that is pre-sterilized by the manufacturer (i.e., disposable funnel units) may be used.

<sup>5</sup> Multiple-tube and multi-well enumerative formats for this method are approved for use in presence-absence determination under this regulation.

<sup>6</sup> Colisure® results may be read after an incubation time of 24 hours.

<sup>7</sup> A multiple tube enumerative format, as described in Standard Methods for the Examination of Water and Wastewater 9221, is approved for this method for use in presence-absence determination under this regulation.

<sup>8</sup> The following changes must be made to the EC broth with MUG (EC-MUG) formulation: Potassium dihydrogen phosphate,  $KH_2PO_4$ , must be 1.5g, and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

- (b) **Laboratory certification.** Systems must have all compliance samples required under this subpart analyzed by a laboratory certified by the EPA or a primacy State to analyze drinking water samples. The laboratory used by the system must be certified for each method (and associated contaminant(s)) used for compliance monitoring analyses under this rule.
- (c) **Incorporation by reference.** The standards required in this section are incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, EPA must publish notice of change in the FEDERAL REGISTER and the material must be available to the public. All approved material is available for inspection either electronically at [www.regulations.gov](http://www.regulations.gov), in hard copy at the Water Docket, or from the sources indicated below. The Docket ID is EPA-HQ-OW-2008-0878. Hard copies of these documents may

be viewed at the Water Docket in the EPA Docket Center, (EPA/DC) EPA West, Room 3334, 1301 Constitution Ave. NW., Washington, DC. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is 1-202-566-1744, and the telephone number for the Water Docket is 1-202-566-2426. Copyrighted materials are only available for viewing in hard copy. These documents are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 1-202-741-6030 or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

(1) American Public Health Association, 800 I Street, NW., Washington, DC 20001.

(i) "Standard Methods for the Examination of Water and Wastewater," 20th edition (1998):

- (A) Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," B.1, B.2, "Standard Total Coliform Fermentation Technique."
- (B) Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," D.1, D.2, "Presence-Absence (P-A) Coliform Test."
- (C) Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," B, "Standard Total Coliform Membrane Filter Procedure."
- (D) Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," C, "Delayed-Incubation Total Coliform Procedure."
- (E) Standard Methods 9223, "Enzyme Substrate Coliform Test," B, "Enzyme Substrate Test," Colilert® and Colisure®.
- (F) Standard Methods 9221, "Multiple Tube Fermentation Technique for Members of the Coliform Group," F.1, "*Escherichia coli* Procedure: EC-MUG medium."
- (G) Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," G.1.c(2), "*Escherichia coli* Partition Method: EC broth with MUG (EC-MUG)."
- (H) Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," G.1.c(1), "*Escherichia coli* Partition Method: NA-MUG medium."

(ii) "Standard Methods for the Examination of Water and Wastewater," 21st edition (2005):

- (A) Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," B.1, B.2, "Standard Total Coliform Fermentation Technique."
- (B) Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," D.1, D.2, "Presence-Absence (P-A) Coliform Test."
- (C) Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," B, "Standard Total Coliform Membrane Filter Procedure."
- (D) Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," C, "Delayed-Incubation Total Coliform Procedure."
- (E) Standard Methods 9223, "Enzyme Substrate Coliform Test," B, "Enzyme Substrate Test," Colilert® and Colisure®.
- (F) Standard Methods 9221, "Multiple Tube Fermentation Technique for Members of the Coliform Group," F.1, "*Escherichia coli* Procedure: EC-MUG medium."



- (G) Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," G.1.c(2), "*Escherichia coli* Partition Method: EC broth with MUG (EC-MUG)."
- (H) Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," G.1.c(1), "*Escherichia coli* Partition Method: NA-MUG medium."
- (iii) "Standard Methods Online" available at <http://www.standardmethods.org>:
  - (A) Standard Methods Online 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group" (1999), B.1, B.2-99, "Standard Total Coliform Fermentation Technique."
  - (B) Standard Methods Online 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group" (1999), D.1, D.2-99, "Presence-Absence (P-A) Coliform Test."
  - (C) Standard Methods Online 9222, "Membrane Filter Technique for Members of the Coliform Group" (1997), B-97, "Standard Total Coliform Membrane Filter Procedure."
  - (D) Standard Methods Online 9222, "Membrane Filter Technique for Members of the Coliform Group" (1997), C-97, "Delayed-Incubation Total Coliform Procedure."
  - (E) Standard Methods Online 9223, "Enzyme Substrate Coliform Test" (1997), B-97, "Enzyme Substrate Test", Colilert® and Colisure®.
- (2) Charm Sciences, Inc., 659 Andover Street, Lawrence, MA 01843-1032, telephone 1-800-343-2170:
  - (i) E\*Colite®—"Charm E\*Colite™ Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Drinking Water," January 9, 1998.
  - (ii) [Reserved]
- (3) CPI International, Inc., 5580 Skylane Blvd., Santa Rosa, CA, 95403, telephone 1-800-878-7654:
  - (i) modified Colitag®, ATP D05-0035—"Modified Colitag™ Test Method for the Simultaneous Detection of *E. coli* and other Total Coliforms in Water," August 28, 2009.
  - (ii) [Reserved]
- (4) EMD Millipore (a division of Merck KGaA, Darmstadt Germany), 290 Concord Road, Billerica, MA 01821, telephone 1-800-645-5476:
  - (i) Chromocult—"Chromocult® Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and *Escherichia coli* for Finished Waters," November 2000, Version 1.0.
  - (ii) Readycult®—"Readycult® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters," January 2007, Version 1.1.
- (5) EPA's Water Resource Center (MC-4100T), 1200 Pennsylvania Avenue NW., Washington, DC 20460, telephone 1-202-566-1729:
  - (i) EPA Method 1604, EPA 821-R-02-024—"EPA Method 1604: Total Coliforms and *Escherichia coli* in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium)," September 2002, <http://www.epa.gov/nerlcwww/1604sp02.pdf>.
  - (ii) [Reserved]

- (6) Hach Company, P.O. Box 389, Loveland, CO 80539, telephone 1-800-604-3493:
  - (i) m-ColiBlue24®—"Membrane Filtration Method m-ColiBlue24® Broth," Revision 2, August 17, 1999.
  - (ii) [Reserved]

[78 FR 10354, Feb. 13, 2013, as amended at 79 FR 10669, Feb. 26, 2014]

## § 141.853 General monitoring requirements for all public water systems.

### (a) Sample siting plans.

- (1) Systems must develop a written sample siting plan that identifies sampling sites and a sample collection schedule that are representative of water throughout the distribution system not later than March 31, 2016. These plans are subject to State review and revision. Systems must collect total coliform samples according to the written sample siting plan. Monitoring required by §§ 141.854 through 141.858 may take place at a customer's premise, dedicated sampling station, or other designated compliance sampling location. Routine and repeat sample sites and any sampling points necessary to meet the requirements of subpart S must be reflected in the sampling plan.
- (2) Systems must collect samples at regular time intervals throughout the month, except that systems that use only ground water and serve 4,900 or fewer people may collect all required samples on a single day if they are taken from different sites.
- (3) Systems must take at least the minimum number of required samples even if the system has had an *E. coli* MCL violation or has exceeded the coliform treatment technique triggers in § 141.859(a).
- (4) A system may conduct more compliance monitoring than is required by this subpart to investigate potential problems in the distribution system and use monitoring as a tool to assist in uncovering problems. A system may take more than the minimum number of required routine samples and must include the results in calculating whether the coliform treatment technique trigger in § 141.859(a)(1)(i) and (ii) has been exceeded only if the samples are taken in accordance with the existing sample siting plan and are representative of water throughout the distribution system.
- (5) Systems must identify repeat monitoring locations in the sample siting plan. Unless the provisions of paragraphs (a)(5)(i) or (a)(5)(ii) of this section are met, the system must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the distribution system, or one service connection away from the end of the distribution system, the system must still take all required repeat samples. However, the State may allow an alternative sampling location in lieu of the requirement to collect at least one repeat sample upstream or downstream of the original sampling site. Except as provided for in paragraph (a)(5)(ii) of this section, systems required to conduct triggered source water monitoring under § 141.402(a) must take ground water source sample(s) in addition to repeat samples required under this subpart.
  - (i) Systems may propose repeat monitoring locations to the State that the system believes to be representative of a pathway for contamination of the distribution system. A system may elect to specify either alternative fixed locations or criteria for selecting repeat sampling sites on a situational basis in a standard operating procedure (SOP) in its sample siting plan. The system

must design its SOP to focus the repeat samples at locations that best verify and determine the extent of potential contamination of the distribution system area based on specific situations. The State may modify the SOP or require alternative monitoring locations as needed.

(ii) Ground water systems serving 1,000 or fewer people may propose repeat sampling locations to the State that differentiate potential source water and distribution system contamination (e.g., by sampling at entry points to the distribution system). A ground water system with a single well required to conduct triggered source water monitoring may, with written State approval, take one of its repeat samples at the monitoring location required for triggered source water monitoring under § 141.402(a) if the system demonstrates to the State's satisfaction that the sample siting plan remains representative of water quality in the distribution system. If approved by the State, the system may use that sample result to meet the monitoring requirements in both § 141.402(a) and this section.

(A) If a repeat sample taken at the monitoring location required for triggered source water monitoring is *E. coli*-positive, the system has violated the *E. coli* MCL and must also comply with § 141.402(a)(3). If a system takes more than one repeat sample at the monitoring location required for triggered source water monitoring, the system may reduce the number of additional source water samples required under § 141.402(a)(3) by the number of repeat samples taken at that location that were not *E. coli*-positive.

(B) If a system takes more than one repeat sample at the monitoring location required for triggered source water monitoring under § 141.402(a), and more than one repeat sample is *E. coli*-positive, the system has violated the *E. coli* MCL and must also comply with § 141.403(a)(1).

(C) If all repeat samples taken at the monitoring location required for triggered source water monitoring are *E. coli*-negative and a repeat sample taken at a monitoring location other than the one required for triggered source water monitoring is *E. coli*-positive, the system has violated the *E. coli* MCL, but is not required to comply with § 141.402(a)(3).

(6) States may review, revise, and approve, as appropriate, repeat sampling proposed by systems under paragraphs (a)(5)(i) and (ii) of this section. The system must demonstrate that the sample siting plan remains representative of the water quality in the distribution system. The State may determine that monitoring at the entry point to the distribution system (especially for undisinfected ground water systems) is effective to differentiate between potential source water and distribution system problems.

(b) **Special purpose samples.** Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, must not be used to determine whether the coliform treatment technique trigger has been exceeded. Repeat samples taken pursuant to § 141.858 are not considered special purpose samples, and must be used to determine whether the coliform treatment technique trigger has been exceeded.

(c) **Invalidation of total coliform samples.** A total coliform-positive sample invalidated under this paragraph (c) of this section does not count toward meeting the minimum monitoring requirements of this subpart.

(1) The State may invalidate a total coliform-positive sample only if the conditions of paragraph (c)(1)(i), (ii), or (iii) of this section are met.

(i) The laboratory establishes that improper sample analysis caused the total coliform-positive result.

- (ii) The State, on the basis of the results of repeat samples collected as required under § 141.858(a), determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The State cannot invalidate a sample 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 at a location other than the original tap are total coliform-negative (e.g., a State cannot invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the system has only one service connection).
  - (iii) The State has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition that does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required under § 141.858(a), and use them to determine whether a coliform treatment technique trigger in § 141.859 has been exceeded. To invalidate a total coliform-positive sample under this paragraph, the decision and supporting rationale must be documented in writing, and approved and signed by the supervisor of the State official who recommended the decision. The State must make this document available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take, to correct this problem. The State may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.
- (2) A laboratory must invalidate a total coliform sample (unless total coliforms are detected) if 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), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P-A) Coliform Test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (e.g., Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The State may waive the 24-hour time limit on a case-by-case basis. Alternatively, the State may implement criteria for waiving the 24-hour sampling time limit to use in lieu of case-by-case extensions.

**§ 141.854 Routine monitoring requirements for non-community water systems serving 1,000 or fewer people using only ground water.**

**(a) General.**

- (1) The provisions of this section apply to non-community water systems using only ground water (except ground water under the direct influence of surface water, as defined in § 141.2) and serving 1,000 or fewer people.
- (2) Following any total coliform-positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in § 141.858.
- (3) Once all monitoring required by this section and § 141.858 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in § 141.859 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by § 141.859.

- (4) For the purpose of determining eligibility for remaining on or qualifying for quarterly monitoring under the provisions of paragraphs (f)(4) and (g)(2), respectively, of this section for transient non-community water systems, the State may elect to not count monitoring violations under § 141.860(c)(1) of this part if the missed sample is collected no later than the end of the monitoring period following the monitoring period in which the sample was missed. The system must collect the make-up sample in a different week than the routine sample for that monitoring period and should collect the sample as soon as possible during the monitoring period. The State may not use this provision under paragraph (h) of this section. This authority does not affect the provisions of §§ 141.860(c)(1) and 141.861(a)(4) of this part.
- (b) **Monitoring frequency for total coliforms.** Systems must monitor each calendar quarter that the system provides water to the public, except for seasonal systems or as provided under paragraphs (c) through (h) and (j) of this section. Seasonal systems must meet the monitoring requirements of paragraph (i) of this section.
- (c) **Transition to subpart Y.**
- (1) Systems, including seasonal systems, must continue to monitor according to the total coliform monitoring schedules under § 141.21 that were in effect on March 31, 2016, unless any of the conditions for increased monitoring in paragraph (f) of this section are triggered on or after April 1, 2016, or unless otherwise directed by the State.
- (2) Beginning April 1, 2016, the State must perform a special monitoring evaluation during each sanitary survey to review the status of the system, including the distribution system, to determine whether the system is on an appropriate monitoring schedule. After the State has performed the special monitoring evaluation during each sanitary survey, the State may modify the system's monitoring schedule, as necessary, or it may allow the system to stay on its existing monitoring schedule, consistent with the provisions of this section. The State may not allow systems to begin less frequent monitoring under the special monitoring evaluation unless the system has already met the applicable criteria for less frequent monitoring in this section. For seasonal systems on quarterly or annual monitoring, this evaluation must include review of the approved sample siting plan, which must designate the time period(s) for monitoring based on site-specific considerations (e.g., during periods of highest demand or highest vulnerability to contamination). The seasonal system must collect compliance samples during these time periods.
- (d) **Annual site visits.** Beginning no later than calendar year 2017, systems on annual monitoring, including seasonal systems, must have an initial and recurring annual site visit by the State that is equivalent to a Level 2 assessment or an annual voluntary Level 2 assessment that meets the criteria in § 141.859(b) to remain on annual monitoring. The periodic required sanitary survey may be used to meet the requirement for an annual site visit for the year in which the sanitary survey was completed.
- (e) **Criteria for annual monitoring.** Beginning April 1, 2016, the State may reduce the monitoring frequency for a well-operated ground water system from quarterly routine monitoring to no less than annual monitoring, if the system demonstrates that it meets the criteria for reduced monitoring in paragraphs (e)(1) through (e)(3) of this section, except for a system that has been on increased monitoring under the provisions of paragraph (f) of this section. A system on increased monitoring under paragraph (f) of this section must meet the provisions of paragraph (g) of this section to go to quarterly monitoring and must meet the provisions of paragraph (h) of this section to go to annual monitoring.
- (1) The system has a clean compliance history for a minimum of 12 months;

- (2) The most recent sanitary survey shows that the system is free of sanitary defects or has corrected all identified sanitary defects, has a protected water source, and meets approved construction standards; and
  - (3) The State has conducted an annual site visit within the last 12 months and the system has corrected all identified sanitary defects. The system may substitute a Level 2 assessment that meets the criteria in § 141.859(b) for the State annual site visit.
- (f) **Increased monitoring requirements for systems on quarterly or annual monitoring.** A system on quarterly or annual monitoring that experiences any of the events identified in paragraphs (f)(1) through (f)(4) of this section must begin monthly monitoring the month following the event. A system on annual monitoring that experiences the event identified in paragraphs (f)(5) of this section must begin quarterly monitoring the quarter following the event. The system must continue monthly or quarterly monitoring until the requirements in paragraph (g) of this section for quarterly monitoring or paragraph (h) of this section for annual monitoring are met. A system on monthly monitoring for reasons other than those identified in paragraphs (f)(1) through (f)(4) of this section is not considered to be on increased monitoring for the purposes of paragraphs (g) and (h) of this section.
- (1) The system triggers a Level 2 assessment or two Level 1 assessments under the provisions of § 141.859 in a rolling 12-month period.
  - (2) The system has an *E. coli* MCL violation.
  - (3) The system has a coliform treatment technique violation.
  - (4) The system has two subpart Y monitoring violations or one subpart Y monitoring violation and one Level 1 assessment under the provisions of § 141.859 in a rolling 12-month period for a system on quarterly monitoring.
  - (5) The system has one subpart Y monitoring violation for a system on annual monitoring.
- (g) **Requirements for returning to quarterly monitoring.** The State may reduce the monitoring frequency for a system on monthly monitoring triggered under paragraph (f) of this section to quarterly monitoring if the system meets the criteria in paragraphs (g)(1) and (g)(2) of this section.
- (1) Within the last 12 months, the system must have a completed sanitary survey or a site visit by the State or a voluntary Level 2 assessment by a party approved by the State, be free of sanitary defects, and have a protected water source; and
  - (2) The system must have a clean compliance history for a minimum of 12 months.
- (h) **Requirements for systems on increased monitoring to qualify for annual monitoring.** The State may reduce the monitoring frequency for a system on increased monitoring under paragraph (f) of this section if the system meets the criteria in paragraph (g) of this section plus the criteria in paragraphs (h)(1) and (h)(2) of this section.
- (1) An annual site visit by the State and correction of all identified sanitary defects. The system may substitute a voluntary Level 2 assessment by a party approved by the State for the State annual site visit in any given year.
  - (2) The system must have in place or adopt one or more additional enhancements to the water system barriers to contamination in paragraphs (h)(2)(i) through (h)(2)(v) of this section.
    - (i) Cross connection control, as approved by the State.

- (ii) An operator certified by an appropriate State certification program or regular visits by a circuit rider certified by an appropriate State certification program.
- (iii) Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the State.
- (iv) Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under § 141.403(b)(3).
- (v) Other equivalent enhancements to water system barriers as approved by the State.

(i) **Seasonal systems.**

- (1) Beginning April 1, 2016, all seasonal systems must demonstrate completion of a State-approved start-up procedure, which may include a requirement for startup sampling prior to serving water to the public.
- (2) A seasonal system must monitor every month that it is in operation unless it meets the criteria in paragraphs (i)(2)(i) through (iii) of this section to be eligible for monitoring less frequently than monthly beginning April 1, 2016, except as provided under paragraph (c) of this section.
  - (i) Seasonal systems monitoring less frequently than monthly must have an approved sample siting plan that designates the time period for monitoring based on site-specific considerations (e.g., during periods of highest demand or highest vulnerability to contamination). Seasonal systems must collect compliance samples during this time period.
  - (ii) To be eligible for quarterly monitoring, the system must meet the criteria in paragraph (g) of this section.
  - (iii) To be eligible for annual monitoring, the system must meet the criteria under paragraph (h) of this section.
- (3) The State may exempt any seasonal system from some or all of the requirements for seasonal systems if the entire distribution system remains pressurized during the entire period that the system is not operating, except that systems that monitor less frequently than monthly must still monitor during the vulnerable period designated by the State.

(j) **Additional routine monitoring the month following a total coliform-positive sample.** Systems collecting samples on a quarterly or annual frequency must conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). Systems must collect at least three routine samples during the next month, except that the State may waive this requirement if the conditions of paragraph (j)(1), (2), or (3) of this section are met. Systems may either collect samples at regular time intervals throughout the month or may collect all required routine samples on a single day if samples are taken from different sites. Systems must use the results of additional routine samples in coliform treatment technique trigger calculations under § 141.859(a).

- (1) The State may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the State, or an agent approved by the State, performs a site visit before the end of the next month in which the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the State

to determine whether additional monitoring and/or any corrective action is needed. The State cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the State to perform sanitary surveys.

- (2) The State may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the State has determined why the sample was total coliform-positive and has established that the system has corrected the problem or will correct the problem before the end of the next month in which the system serves water to the public. In this case, the State must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the State official who recommends such a decision, and make this document available to the EPA and public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem.
- (3) The State may not waive the requirement to collect three additional routine samples the next month in which the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. If the State determines that the system has corrected the contamination problem before the system takes the set of repeat samples required in § 141.858, and all repeat samples were total coliform-negative, the State may waive the requirement for additional routine monitoring the next month.

**§ 141.855 Routine monitoring requirements for community water systems serving 1,000 or fewer people using only ground water.**

**(a) General.**

- (1) The provisions of this section apply to community water systems using only ground water (except ground water under the direct influence of surface water, as defined in § 141.2) and serving 1,000 or fewer people.
- (2) Following any total coliform-positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in § 141.858.
- (3) Once all monitoring required by this section and § 141.858 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in § 141.859 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by § 141.859.

**(b) Monitoring frequency for total coliforms.** The monitoring frequency for total coliforms is one sample/month, except as provided for under paragraphs (c) through (f) of this section.

**(c) Transition to subpart Y.**

- (1) All systems must continue to monitor according to the total coliform monitoring schedules under § 141.21 that were in effect on March 31, 2016, unless any of the conditions in paragraph (e) of this section are triggered on or after April 1, 2016, or unless otherwise directed by the State.
- (2) Beginning April 1, 2016, the State must perform a special monitoring evaluation during each sanitary survey to review the status of the system, including the distribution system, to determine whether the system is on an appropriate monitoring schedule. After the State has performed the special monitoring evaluation during each sanitary survey, the State may modify the system's monitoring schedule, as necessary, or it may allow the system to stay on its existing monitoring schedule,



consistent with the provisions of this section. The State may not allow systems to begin less frequent monitoring under the special monitoring evaluation unless the system has already met the applicable criteria for less frequent monitoring in this section.

(d) **Criteria for reduced monitoring.**

(1) The State may reduce the monitoring frequency from monthly monitoring to no less than quarterly monitoring if the system is in compliance with State-certified operator provisions and demonstrates that it meets the criteria in paragraphs (d)(1)(i) through (d)(1)(iii) of this section. A system that loses its certified operator must return to monthly monitoring the month following that loss.

(i) The system has a clean compliance history for a minimum of 12 months.

(ii) The most recent sanitary survey shows the system is free of sanitary defects (or has an approved plan and schedule to correct them and is in compliance with the plan and the schedule), has a protected water source and meets approved construction standards.

(iii) The system meets at least one of the following criteria:

(A) An annual site visit by the State that is equivalent to a Level 2 assessment or an annual Level 2 assessment by a party approved by the State and correction of all identified sanitary defects (or an approved plan and schedule to correct them and is in compliance with the plan and schedule).

(B) Cross connection control, as approved by the State.

(C) Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the State.

(D) Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under § 141.403(b)(3).

(E) Other equivalent enhancements to water system barriers as approved by the State.

(2) [Reserved]

(e) **Return to routine monthly monitoring requirements.** Systems on quarterly monitoring that experience any of the events in paragraphs (e)(1) through (e)(4) of this section must begin monthly monitoring the month following the event. The system must continue monthly monitoring until it meets the reduced monitoring requirements in paragraph (d) of this section.

(1) The system triggers a Level 2 assessment or two Level 1 assessments in a rolling 12-month period.

(2) The system has an *E. coli* MCL violation.

(3) The system has a coliform treatment technique violation.

(4) The system has two subpart Y monitoring violations in a rolling 12-month period.

(f) **Additional routine monitoring the month following a total coliform-positive sample.** Systems collecting samples on a quarterly frequency must conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). Systems must collect at least three routine samples during the next month, except that the State may waive this requirement if the conditions of paragraph (f)(1), (2), or (3) of this section are met. Systems may either

collect samples at regular time intervals throughout the month or may collect all required routine samples on a single day if samples are taken from different sites. Systems must use the results of additional routine samples in coliform treatment technique trigger calculations.

- (1) The State may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the State, or an agent approved by the State, performs a site visit before the end of the next month in which the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the State to determine whether additional monitoring and/or any corrective action is needed. The State cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the State to perform sanitary surveys.
- (2) The State may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the State has determined why the sample was total coliform-positive and has established that the system has corrected the problem or will correct the problem before the end of the next month in which the system serves water to the public. In this case, the State must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the State official who recommends such a 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 and what action the system has taken and/or will take to correct this problem.
- (3) The State may not waive the requirement to collect three additional routine samples the next month in which the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. If the State determines that the system has corrected the contamination problem before the system takes the set of repeat samples required in § 141.858, and all repeat samples were total coliform-negative, the State may waive the requirement for additional routine monitoring the next month.

#### **§ 141.856 Routine monitoring requirements for subpart H public water systems serving 1,000 or fewer people.**

**(a) General.**

- (1) The provisions of this section apply to subpart H public water systems of this part serving 1,000 or fewer people.
- (2) Following any total coliform-positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in § 141.858.
- (3) Once all monitoring required by this section and § 141.858 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in § 141.859 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by § 141.859.
- (4) Seasonal systems.
  - (i) Beginning April 1, 2016, all seasonal systems must demonstrate completion of a State-approved start-up procedure, which may include a requirement for start-up sampling prior to serving water to the public.

- (ii) The State may exempt any seasonal system from some or all of the requirements for seasonal systems if the entire distribution system remains pressurized during the entire period that the system is not operating.
- (b) **Routine monitoring frequency for total coliforms.** Subpart H systems of this part (including consecutive systems) must monitor monthly. Systems may not reduce monitoring.
- (c) **Unfiltered subpart H systems.** A subpart H system of this part that does not practice filtration in compliance with subparts H, P, T, and W must collect at least one total coliform sample near the first service connection each day the turbidity level of the source water, measured as specified in § 141.74(b)(2), exceeds 1 NTU. When one or more turbidity measurements in any day exceed 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance, unless the State determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection and identifies an alternative sample collection schedule. Sample results from this coliform monitoring must be included in determining whether the coliform treatment technique trigger in § 141.859 has been exceeded.

**§ 141.857 Routine monitoring requirements for public water systems serving more than 1,000 people.**

- (a) **General.**
  - (1) The provisions of this section apply to public water systems serving more than 1,000 persons.
  - (2) Following any total coliform-positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in § 141.858.
  - (3) Once all monitoring required by this section and § 141.858 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in § 141.859 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by § 141.859.
- (4) **Seasonal systems.**
  - (i) Beginning April 1, 2016, all seasonal systems must demonstrate completion of a State-approved start-up procedure, which may include a requirement for start-up sampling prior to serving water to the public.
  - (ii) The State may exempt any seasonal system from some or all of the requirements for seasonal systems if the entire distribution system remains pressurized during the entire period that the system is not operating.

- (b) **Monitoring frequency for total coliforms.** The monitoring frequency for total coliforms is based on the population served by the system, as follows:

**TOTAL COLIFORM MONITORING FREQUENCY FOR PUBLIC WATER SYSTEMS SERVING  
MORE THAN 1,000 PEOPLE**

Population served	Minimum number of samples per month
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 970,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450

Population served	Minimum number of samples per month
3,960,001 or more	480

- (c) **Unfiltered subpart H systems.** A subpart H system of this part that does not practice filtration in compliance with subparts H, P, T, and W must collect at least one total coliform sample near the first service connection each day the turbidity level of the source water, measured as specified in § 141.74(b)(2), exceeds 1 NTU. When one or more turbidity measurements in any day exceed 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance, unless the State determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection and identifies an alternative sample collection schedule. Sample results from this coliform monitoring must be included in determining whether the coliform treatment technique trigger in § 141.859 has been exceeded.
- (d) **Reduced monitoring.** Systems may not reduce monitoring, except for non-community water systems using only ground water (and not ground water under the direct influence of surface water) serving 1,000 or fewer people in some months and more than 1,000 persons in other months. In months when more than 1,000 persons are served, the systems must monitor at the frequency specified in paragraph (a) of this section. In months when 1,000 or fewer people are served, the State may reduce the monitoring frequency, in writing, to a frequency allowed under § 141.854 for a similarly situated system that always serves 1,000 or fewer people, taking into account the provisions in § 141.854(e) through (g).

#### § 141.858 Repeat monitoring and *E. coli* requirements.

- (a) **Repeat monitoring.**
- (1) If a sample taken under §§ 141.854 through 141.857 is total coliform-positive, the system must collect a set of repeat samples within 24 hours of being notified of the positive result. The system must collect no fewer than three repeat samples for each total coliform-positive sample found. The State may extend the 24-hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. Alternatively, the State may implement criteria for the system to use in lieu of case-by-case extensions. In the case of an extension, the State must specify how much time the system has to collect the repeat samples. The State cannot waive the requirement for a system to collect repeat samples in paragraphs (a)(1) through (a)(3) of this section.
  - (2) The system must collect all repeat samples on the same day, except that the State may allow a system with a single service connection to collect the required set of repeat samples over a three-day period or to collect a larger volume repeat sample(s) in one or more sample containers of any size, as long as the total volume collected is at least 300 ml.
  - (3) The system must collect an additional set of repeat samples in the manner specified in paragraphs (a)(1) through (a)(3) of this section if one or more repeat samples in the current set of repeat samples is total coliform-positive. The system must collect the additional set of repeat samples within 24 hours of being notified of the positive result, unless the State extends the limit as provided in paragraph (a)(1) of this section. The system must continue to collect additional sets of repeat samples until either total coliforms are not detected in one complete set of repeat samples or the system determines that a coliform treatment technique trigger specified in § 141.859(a) has been

exceeded as a result of a repeat sample being total coliform-positive and notifies the State. If a trigger identified in § 141.859 is exceeded as a result of a routine sample being total coliform-positive, systems are required to conduct only one round of repeat monitoring for each total coliform-positive routine sample.

- (4) After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.
- (5) Results of all routine and repeat samples taken under §§ 141.854 through 141.858 not invalidated by the State must be used to determine whether a coliform treatment technique trigger specified in § 141.859 has been exceeded.

(b) *Escherichia coli* (*E. coli*) testing.

- (1) If any routine or repeat sample is total coliform-positive, the system must analyze that total coliform-positive culture medium to determine if *E. coli* are present. If *E. coli* are present, the system must notify the State by the end of the day when the system is notified of the test result, unless the system is notified of the result after the State office is closed and the State does not have either an after-hours phone line or an alternative notification procedure, in which case the system must notify the State before the end of the next business day.
- (2) The State has the discretion to allow a system, on a case-by-case basis, to forgo *E. coli* testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is *E. coli*-positive. Accordingly, the system must notify the State as specified in paragraph (b)(1) of this section and the provisions of § 141.63(c) apply.

**§ 141.859 Coliform treatment technique triggers and assessment requirements for protection against potential fecal contamination.**

- (a) *Treatment technique triggers.* Systems must conduct assessments in accordance with paragraph (b) of this section after exceeding treatment technique triggers in paragraphs (a)(1) and (a)(2) of this section.

- (1) Level 1 treatment technique triggers.
  - (i) For systems taking 40 or more samples per month, the system exceeds 5.0% total coliform-positive samples for the month.
  - (ii) For systems taking fewer than 40 samples per month, the system has two or more total coliform-positive samples in the same month.
  - (iii) The system fails to take every required repeat sample after any single total coliform-positive sample.
- (2) Level 2 treatment technique triggers.
  - (i) An *E. coli* MCL violation, as specified in § 141.860(a).
  - (ii) A second Level 1 trigger as defined in paragraph (a)(1) of this section, within a rolling 12-month period, unless the State has determined a likely reason that the samples that caused the first Level 1 treatment technique trigger were total coliform-positive and has established that the system has corrected the problem.
  - (iii) For systems with approved annual monitoring, a Level 1 trigger in two consecutive years.

(b) *Requirements for assessments.*

- (1) Systems must ensure that Level 1 and 2 assessments are conducted in order to identify the possible presence of sanitary defects and defects in distribution system coliform monitoring practices. Level 2 assessments must be conducted by parties approved by the State.
- (2) When conducting assessments, systems must ensure that the assessor evaluates minimum elements that include review and identification of inadequacies in sample sites; sampling protocol; sample processing; atypical events that could affect distributed water quality or indicate that distributed water quality was impaired; changes in distribution system maintenance and operation that could affect distributed water quality (including water storage); source and treatment considerations that bear on distributed water quality, where appropriate (e.g., small ground water systems); and existing water quality monitoring data. The system must conduct the assessment consistent with any State directives that tailor specific assessment elements with respect to the size and type of the system and the size, type, and characteristics of the distribution system.
- (3) **Level 1 assessments.** A system must conduct a Level 1 assessment consistent with State requirements if the system exceeds one of the treatment technique triggers in paragraph (a)(1) of this section.
  - (i) The system must complete a Level 1 assessment as soon as practical after any trigger in paragraph (a)(1) of this section. In the completed assessment form, the system must describe sanitary defects detected, corrective actions completed, and a proposed timetable for any corrective actions not already completed. The assessment form may also note that no sanitary defects were identified. The system must submit the completed Level 1 assessment form to the State within 30 days after the system learns that it has exceeded a trigger.
  - (ii) If the State reviews the completed Level 1 assessment and determines that the assessment is not sufficient (including any proposed timetable for any corrective actions not already completed), the State must consult with the system. If the State requires revisions after consultation, the system must submit a revised assessment form to the State on an agreed-upon schedule not to exceed 30 days from the date of the consultation.
  - (iii) Upon completion and submission of the assessment form by the system, the State must determine if the system has identified a likely cause for the Level 1 trigger and, if so, establish that the system has corrected the problem, or has included a schedule acceptable to the State for correcting the problem.
- (4) **Level 2 assessments.** A system must ensure that a Level 2 assessment consistent with State requirements is conducted if the system exceeds one of the treatment technique triggers in paragraph (a)(2) of this section. The system must comply with any expedited actions or additional actions required by the State in the case of an *E. coli* MCL violation.
  - (i) The system must ensure that a Level 2 assessment is completed by the State or by a party approved by the State as soon as practical after any trigger in paragraph (a)(2) of this section. The system must submit a completed Level 2 assessment form to the State within 30 days after the system learns that it has exceeded a trigger. The assessment form must describe sanitary defects detected, corrective actions completed, and a proposed timetable for any corrective actions not already completed. The assessment form may also note that no sanitary defects were identified.

- (ii) The system may conduct Level 2 assessments if the system has staff or management with the certification or qualifications specified by the State unless otherwise directed by the State.
  - (iii) If the State reviews the completed Level 2 assessment and determines that the assessment is not sufficient (including any proposed timetable for any corrective actions not already completed), the State must consult with the system. If the State requires revisions after consultation, the system must submit a revised assessment form to the State on an agreed-upon schedule not to exceed 30 days.
  - (iv) Upon completion and submission of the assessment form by the system, the State must determine if the system has identified a likely cause for the Level 2 trigger and determine whether the system has corrected the problem, or has included a schedule acceptable to the State for correcting the problem.
- (c) **Corrective action.** Systems must correct sanitary defects found through either Level 1 or 2 assessments conducted under paragraph (b) of this section. For corrections not completed by the time of submission of the assessment form, the system must complete the corrective action(s) in compliance with a timetable approved by the State in consultation with the system. The system must notify the State when each scheduled corrective action is completed.
- (d) **Consultation.** At any time during the assessment or corrective action phase, either the water system or the State may request a consultation with the other party to determine the appropriate actions to be taken. The system may consult with the State on all relevant information that may impact on its ability to comply with a requirement of this subpart, including the method of accomplishment, an appropriate timeframe, and other relevant information.

## § 141.860 Violations.

- (a) ***E. coli* MCL Violation.** A system is in violation of the MCL for *E. coli* when any of the conditions identified in paragraphs (a)(1) through (a)(4) of this section occur.
- (1) The system has an *E. coli*-positive repeat sample following a total coliform-positive routine sample.
  - (2) The system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample.
  - (3) The system fails to take all required repeat samples following an *E. coli*-positive routine sample.
  - (4) The system fails to test for *E. coli* when any repeat sample tests positive for total coliform.
- (b) **Treatment technique violation.**
- (1) A treatment technique violation occurs when a system exceeds a treatment technique trigger specified in § 141.859(a) and then fails to conduct the required assessment or corrective actions within the timeframe specified in § 141.859(b) and (c).
  - (2) A treatment technique violation occurs when a seasonal system fails to complete a State-approved start-up procedure prior to serving water to the public.
- (c) **Monitoring violations.**
- (1) Failure to take every required routine or additional routine sample in a compliance period is a monitoring violation.
  - (2) Failure to analyze for *E. coli* following a total coliform-positive routine sample is a monitoring violation.



(d) **Reporting violations.**

- (1) Failure to submit a monitoring report or completed assessment form after a system properly conducts monitoring or assessment in a timely manner is a reporting violation.
- (2) Failure to notify the State following an *E. coli*-positive sample as required by § 141.858(b)(1) in a timely manner is a reporting violation.
- (3) Failure to submit certification of completion of State-approved start-up procedure by a seasonal system is a reporting violation.

**§ 141.861 Reporting and recordkeeping.**

(a) **Reporting –**

(1) ***E. coli.***

- (i) A system must notify the State by the end of the day when the system learns of an *E. coli* MCL violation, unless the system learns of the violation after the State office is closed and the State does not have either an after-hours phone line or an alternative notification procedure, in which case the system must notify the State before the end of the next business day, and notify the public in accordance with subpart Q of this part.
- (ii) A system must notify the State by the end of the day when the system is notified of an *E. coli*-positive routine sample, unless the system is notified of the result after the State office is closed and the State does not have either an after-hours phone line or an alternative notification procedure, in which case the system must notify the State before the end of the next business day.
- (2) A system that has violated the treatment technique for coliforms in § 141.859 must report the violation to the State no later than the end of the next business day after it learns of the violation, and notify the public in accordance with subpart Q of this part.
- (3) A system required to conduct an assessment under the provisions of § 141.859 of this part must submit the assessment report within 30 days. The system must notify the State in accordance with § 141.859(c) when each scheduled corrective action is completed for corrections not completed by the time of submission of the assessment form.
- (4) A system that has failed to comply with a coliform monitoring requirement must report the monitoring violation to the State within 10 days after the system discovers the violation, and notify the public in accordance with subpart Q of this part.
- (5) A seasonal system must certify, prior to serving water to the public, that it has complied with the State-approved start-up procedure.

(b) **Recordkeeping.**

- (1) The system must maintain any assessment form, regardless of who conducts the assessment, and documentation of corrective actions completed as a result of those assessments, or other available summary documentation of the sanitary defects and corrective actions taken under § 141.859 for State review. This record must be maintained by the system for a period not less than five years after completion of the assessment or corrective action.

- (2) The system must maintain a record of any repeat sample taken that meets State criteria for an extension of the 24-hour period for collecting repeat samples as provided for under § 141.858(a)(1) of this part.

[78 FR 10354, Feb. 13, 2013, as amended at 79 FR 10670, Feb. 26, 2014]

## Subpart Z—Control of Per- and Polyfluoroalkyl Substances (PFAS)

**Source:** 89 FR 32750, Apr. 26, 2024, unless otherwise noted.

### § 141.900 General requirements.

- (a) The requirements of this subpart constitute the national primary drinking water regulations for PFAS. Each community water system (CWS) and non-transient, non-community water system (NTNCWS) must meet the requirements of this subpart including the maximum contaminant levels for the PFAS identified in § 141.61(c).
- (b) The deadlines for complying with the provisions of this subpart are as follows:
  - (1) Each system must meet the analytical requirements in § 141.901 by June 25, 2024.
  - (2) Each system must report the results of initial monitoring, as described in § 141.902(b)(1), to the State by April 26, 2027.
  - (3) Each system must meet the compliance monitoring requirements in § 141.902(b)(2) by April 26, 2027.
  - (4) Each system must meet the MCL compliance requirements in § 141.903 by April 26, 2029.
  - (5) Each system must meet the reporting and recordkeeping requirements in § 141.904 by April 26, 2027.
  - (6) Violations described in § 141.905 include monitoring and reporting violations and violations of MCLs. Monitoring and reporting violations may be assessed beginning on April 26, 2027. MCL violations may be assessed beginning on April 26, 2029.

### § 141.901 Analytical requirements.

- (a) **General.**
  - (1) Systems must use only the analytical methods specified in this section to demonstrate compliance with the requirements of this subpart.
  - (2) The following documents are incorporated by reference with the approval of the Director of the FEDERAL REGISTER in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. This material is available for inspection at the EPA and at the National Archives and Records Administration (NARA). Contact the EPA's Drinking Water Docket at: 1301 Constitution Avenue NW., EPA West, Room 3334, Washington, DC 20460; phone: 202-566-2426. For information on the availability of this material at NARA, email: [fr.inspection@nara.gov](mailto:fr.inspection@nara.gov), or go to: [www.archives.gov/federal-register/cfr/ibr-locations](http://www.archives.gov/federal-register/cfr/ibr-locations). The material may be obtained from the EPA at 1301 Constitution Avenue NW, the EPA West, Room 3334, Washington, DC 20460; phone: 202-566-2426; website: <https://www.epa.gov/pfas/epa-pfas-drinking-water-laboratory-methods>.

- (i) EPA Method 533: Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry, 815-B-19-020, November 2019.
- (ii) Method 537.1, Version 2.0: Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), EPA/600/R-20/006, March 2020.

- (b) **PFAS -(1) Analytical methods.** Systems must measure regulated PFAS by the methods listed in the following table:

**TABLE 1 TO PARAGRAPH (b)(1)—ANALYTICAL METHODS FOR PFAS CONTAMINANTS**

Contaminant	Methodology	EPA method (incorporated by reference, see paragraph (a) of this section)
Perfluorobutane Sulfonate (PFBS)	SPE LC-MS/ MS	533, 537.1, version 2.0.
Perfluorohexane Sulfonate (PFHxS)	SPE LC-MS/ MS	533, 537.1, version 2.0.
Perfluorononanoate (PFNA)	SPE LC-MS/ MS	533, 537.1, version 2.0.
Perfluorooctanesulfonic Acid (PFOS)	SPE LC-MS/ MS	533, 537.1, version 2.0.
Perfluorooctanoic Acid (PFOA)	SPE LC-MS/ MS	533, 537.1, version 2.0.
2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (HFPO-DA or GenX Chemicals)	SPE LC-MS/ MS	533, 537.1, version 2.0.

- (2) **Laboratory certification.** Analyses under this section for regulated PFAS must only be conducted by laboratories that have been certified by EPA or the State. To receive certification to conduct analyses for the regulated PFAS, the laboratory must:
- (i) Analyze Performance Evaluation (PE) samples that are acceptable to the State at least once during each consecutive 12-month period by each method for which the laboratory desires certification.

- (ii) Beginning June 25, 2024, achieve quantitative results on the PE sample analyses that are within the following acceptance limits:

**TABLE 2 TO PARAGRAPH (b)(2)(ii)—ACCEPTANCE LIMITS FOR PFAS PERFORMANCE  
EVALUATION SAMPLES**

Contaminant	Acceptance limits (percent of true value)
Perfluorobutane Sulfonate (PFBS)	70-130
Perfluorohexane Sulfonate (PFHxS)	70-130
Perfluorononanoate (PFNA)	70-130
Perfluorooctanesulfonic Acid (PFOS)	70-130
Perfluorooctanoic Acid (PFOA)	70-130
2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoate (HFPO-DA or GenX Chemicals)	70-130

- (iii) For all samples analyzed for regulated PFAS in compliance with § 141.902, beginning June 25, 2024, report data for concentrations as low as the trigger levels as defined in § 141.902(a)(5).

### **§ 141.902 Monitoring requirements.**

**(a) General requirements.**

- (1) Systems must take all samples during normal operating conditions at all entry points to the distribution system.
- (2) If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of representative operating conditions.
- (3) Systems must use only data collected under the provisions of this subpart to qualify for reduced monitoring.
- (4) All new systems that begin operation after, or systems that use a new source of water after April 26, 2027, must demonstrate compliance with the MCLs within a period of time specified by the State. A system must also comply with initial sampling frequencies required by the State to ensure that the system can demonstrate compliance with the MCLs. Compliance monitoring frequencies must be conducted in accordance with the requirements in this section.

- (5) For purposes of this section, the trigger levels are defined as shown in the following table.

**TABLE 1 TO PARAGRAPH (a)(5)—TRIGGER LEVELS FOR PFAS CONTAMINANTS**

Contaminant	Trigger level
Hazard Index PFAS (HFPO-DA, PFBS, PFHxS, PFNA)	0.5 (unitless).
HFPO-DA	5 nanograms per liter (ng/l).
PFHxS	5 ng/l.
PFNA	5 ng/l.
PFOA	2.0 ng/l.
PFOS	2.0 ng/l.

- (6) Based on initial monitoring results, for each sampling point at which a regulated PFAS listed in § 141.61(c) is detected at a level greater than or equal to the trigger level, the system must monitor quarterly for all regulated PFAS beginning April 26, 2027, in accordance with paragraph (b)(2) of this section.
- (7) For purposes of this section, each water system must ensure that all results provided by a laboratory are reported to the State and used for determining the required sampling frequencies. This includes values below the practical quantitation levels defined in § 141.903(f)(1)(iv); zero must not be used in place of reported values.

**(b) Monitoring requirements for PFAS —**

**(1) Initial monitoring.**

- (i) Groundwater CWS and NTNCWS serving greater than 10,000 persons and all surface water CWS and NTNCWS must take four consecutive samples 2 to 4 months apart within a 12-month period (quarterly samples) for each regulated PFAS listed in § 141.61(c).
- (ii) All groundwater CWS and NTNCWS serving 10,000 or fewer persons must take two samples for each regulated PFAS listed in § 141.61(c) five to seven months apart within a 12-month period.
- (iii) All groundwater under the direct influence of surface water (GWUDI) CWS and NTNCWS must follow the surface water CWS and NTNCWS monitoring schedule in paragraph (b)(1)(i) of this section.
- (iv) All systems that use both surface water and groundwater must apply the requirements in paragraphs (b)(1)(i) through (iii) of this section depending on the source(s) of water provided at a given entry point to the distribution system (EPTDS). If the EPTDS provides surface water, the requirements for a surface water CWS/NTNCWS apply. If the EPTDS provides groundwater, the requirements for a groundwater CWS/NTNCWS apply, based on system size. If an EPTDS provides a blend of surface water and groundwater, the requirements for a surface water system apply. For systems that change the source water type at an EPTDS during the initial monitoring period (*i.e.*, one part of the year it is surface water and the remaining part of the year it is groundwater), the sampling requirements for a surface water system apply.

- (v) Systems must monitor at a frequency indicated in the following table, though a State may require more frequent monitoring on a system-specific basis:

**TABLE 2 TO PARAGRAPH (b)(1)(v)—INITIAL MONITORING REQUIREMENTS**

Type of system	Minimum monitoring frequency	Sample location
Groundwater CWS and NTNCWS serving greater than 10,000 persons, all surface water CWS and NTNCWS, and all GWUDI systems	Four consecutive quarters of samples per entry point to the distribution system (EPTDS) within a 12-month period, unless the exception in paragraph (b)(1)(viii) of this section applies. Samples must be taken two to four months apart.	Sampling point for EPTDS.
Groundwater CWS and NTNCWS serving 10,000 or fewer persons	Two consecutive samples per EPTDS within a 12-month period, unless the exception in paragraph (b)(1)(viii) of this section applies. Samples must be taken five to seven months apart.	Sampling point for EPTDS.

- (vi) A State may accept data that has been previously acquired by a water system to count toward the initial monitoring requirements if the data meet the requirements of § 141.901(b)(1), samples were collected starting on or after January 1, 2019, and otherwise meet the timing requirements specified in table 2 to paragraph (b)(1)(v) of this section. For the purposes of satisfying initial monitoring requirements, acceptable data may be reported to a concentration no greater than the MCLs. However, a system is only eligible for triennial monitoring at the start of the compliance monitoring period if the system demonstrates that concentrations in all samples it uses to satisfy the initial monitoring requirements are below the trigger levels as defined in paragraph (a)(5) of this section.
- (vii) If systems have multiple years of data, the most recent data must be used.
- (viii) For systems using previously acquired data that have fewer than the number of samples required in a continuous 12-month period for initial monitoring as listed in table 2 to paragraph (b)(1)(v) of this section: All surface water systems, GWUDI systems, and groundwater systems serving greater than 10,000 persons must collect in a calendar year one sample in each quarter that was not represented, two to four months apart from the months with available data; All groundwater systems serving 10,000 or fewer persons must collect one sample in the month that is five to seven months apart from the month in which the previous sample was taken.
- (ix) In determining the most recent data to report, a system must include all results provided by a laboratory whether above or below the practical quantitation levels. These results must be used for the purposes of determining the frequency with which a system must monitor at that sampling point at the start of the compliance monitoring period.
- (x) States may delete results of obvious sampling errors. If the State deletes a result because of an obvious sampling error and the system fails to collect another sample this is a monitoring violation as described in § 141.905(c).

- (xi) Initial monitoring requirements, including reporting results to the State, must be completed by April 26, 2027.

(2) **Compliance monitoring.**

- (i) Based on initial monitoring results, at the start of the monitoring period that begins on April 26, 2027, systems may reduce monitoring at each sampling point at which all reported sample concentrations were below all trigger levels defined in paragraph (a)(5) of this section, unless otherwise provided for by the State. At eligible sampling points, each water system must analyze one sample for all regulated PFAS during each three-year monitoring period, at a time specified by the State, in the quarter in which the highest analytical result was detected during the most recent round of quarterly or semi-annual monitoring. If a sampling point is not eligible for triennial monitoring, then the water system must monitor quarterly at the start of the compliance monitoring period.
- (ii) If, during the compliance monitoring period, a system is monitoring triennially and a PFAS listed in § 141.61(c) is detected at a level equal to or exceeding the trigger levels defined in paragraph (a)(5) of this section in any sample, then the system must monitor quarterly for all regulated PFAS beginning in the next quarter at the sampling point. The triggering sample must be used as the first quarter of monitoring for the running annual average calculation.
- (iii) For all source water types, a State may determine that all regulated PFAS at a sampling point are reliably and consistently below the MCL after considering, at a minimum, four consecutive quarterly samples collected during the compliance monitoring period. A sampling point that a State has determined to be reliably and consistently below the MCL is required to collect annual samples for at least the first three years after that determination is made. Annual samples must be collected in the quarter in which detected concentrations were highest during the most recent year of quarterly monitoring. If, after three consecutive years, annual samples all contain results that are below the trigger levels defined in paragraph (a)(5) of this section, the State may allow a system to begin triennial monitoring at the sampling point. The water system must collect triennial samples in the quarter with the highest concentrations during the most recent round of quarterly sampling. If an annual sample meets or exceeds an MCL or the State determines that the result is not reliably and consistently below the MCL for all regulated PFAS, then the system must monitor quarterly for all regulated PFAS beginning in the next quarter at the sampling point.
- (iv) The three different compliance monitoring sampling schedules that may be assigned and the criteria for each are summarized in the following table:

Table 3 to paragraph (b)(2)(iv)—Compliance Monitoring Schedules and Requirements

Sampling frequency	Eligibility requirements <sup>1</sup>	Sample timing requirements
Triennial	At an individual sampling point, either:	Sample must be collected at a time within

<sup>1</sup> The monitoring frequency at a sampling point must be the same for all regulated PFAS and is determined based on the most frequent sampling required for any regulated PFAS detected at a level at or exceeding the trigger level.

Sampling frequency	Eligibility requirements <sup>1</sup>	Sample timing requirements
	<p>(1) All initial monitoring results demonstrate concentrations of all regulated PFAS below trigger levels;</p> <p>(2) The most recent three consecutive annual monitoring results all demonstrated concentrations of all regulated PFAS below trigger levels; or</p> <p>(3) The previous triennial sample demonstrated all regulated PFAS concentrations below trigger levels.</p> <p>NOTE: After beginning compliance monitoring, a system may not transition directly from quarterly monitoring to triennial monitoring.</p>	<p>the three-year period designated by the State, in the quarter that yielded the highest analytical result during the most recent round of quarterly sampling (or the most recent semi-annual sampling, if no quarterly sampling has occurred).</p>
Annual	<p>A State makes a determination that all regulated PFAS concentrations at the sampling point are reliably and consistently below PFAS MCLs, after considering, at a minimum, 4 consecutive quarterly samples collected during the compliance monitoring period.</p>	<p>Sample must be collected at a time designated by the State, within the quarter that yielded the highest analytical result during the most recent round of quarterly sampling.</p>
Quarterly	<p>At an individual sampling point, either:</p> <p>(1) Any regulated PFAS concentration meets or exceeds a trigger level during initial monitoring;</p> <p>(2) Sampling is occurring quarterly during compliance monitoring and a State has not made a determination that all levels of regulated PFAS at the sampling point are reliably and consistently below the regulated PFAS MCLs; or</p> <p>(3) A sample collected by a system required to conduct triennial monitoring contains regulated PFAS concentrations that meet or exceed trigger levels. The first of these samples meeting or exceeding the trigger level is considered the first quarterly sample.</p>	<p>Samples must be collected in four consecutive quarters, on dates designated by the State.</p>

<sup>1</sup> The monitoring frequency at a sampling point must be the same for all regulated PFAS and is determined based on the most frequent sampling required for any regulated PFAS detected at a level at or exceeding the trigger level.



Sampling frequency	Eligibility requirements <sup>1</sup>	Sample timing requirements
	(4) A sample collected by a system required to conduct annual monitoring contains regulated PFAS concentrations that meet or exceed an MCL. The first of these samples meeting or exceeding the MCL is considered the first quarterly sample.	

<sup>1</sup> The monitoring frequency at a sampling point must be the same for all regulated PFAS and is determined based on the most frequent sampling required for any regulated PFAS detected at a level at or exceeding the trigger level.

- (v) The State may require a confirmation sample for any sampling result. If a confirmation sample is required by the State, the system must average the result with the first sampling result and the average must be used for the determination of compliance with MCLs as specified by § 141.903. A State may delete results of obvious sampling errors from the MCL compliance calculations described in § 141.903. If the State deletes a result because of an obvious sampling error and the system fails to collect another sample this is a monitoring violation as described in § 141.905(c).
- (vi) The State may increase the required monitoring frequency, where necessary, to detect variations within the system (e.g., fluctuations in concentration due to seasonal use, changes in water source).
- (vii) Each public water system must monitor at the time designated by the State within each monitoring period.
- (viii) When a system reduces its sampling frequency to annual or triennial sampling, the next compliance sample must be collected in the monitoring period that begins the calendar year following State approval of a reduction in monitoring frequency.

### § 141.903 Compliance requirements.

- (a) Compliance with MCLs for regulated PFAS in § 141.61(c) must be determined based on the analytical results obtained at each sampling point.
- (b) For systems monitoring quarterly, compliance with the MCL is determined by the running annual average at each sampling point.
- (c) If a system fails to collect the required number of samples specified in § 141.902, this is a monitoring violation as described in § 141.905(c), and compliance calculations must be based on the total number of samples collected.
- (d) Systems monitoring triennially whose sample result equals or exceeds the trigger level of 2.0 ng/l for either PFOS or PFOA, 5 ng/l for HFPO-DA, PFHxS, or PFNA, or a Hazard Index of 0.5 for the Hazard Index PFAS, must begin quarterly sampling for all regulated PFAS in the next quarter at the sampling point.

Systems monitoring annually whose sample result equals or exceeds the MCL of 4.0 ng/l for either PFOS or PFOA, 10 ng/l for HFPO-DA, PFHxS, or PFNA, or a Hazard Index of 1 for the Hazard Index PFAS, must begin quarterly sampling for all regulated PFAS in the next quarter at the sampling point.

- (e) Except as provided in this paragraph (e), if a sample result exceeds an MCL, the system will not be considered in violation of the MCL until it has completed one year of quarterly sampling at the sampling point with the triggering sample used as the first quarter of monitoring for the running annual average calculation. However, whenever a sample result in any quarter (or quarterly average, if more than one compliance sample is available in a quarter because a confirmation sample was required by the State) causes the running annual average to exceed the MCL at a sampling point regardless of the subsequent quarterly monitoring results required to complete a full year of monitoring (e.g., the results from a single sample are more than 4 times the MCL), the system is out of compliance with the MCL immediately.
- (f) Systems must calculate compliance using the following method to determine MCL compliance at each sampling point:

(1) For each PFAS regulated by an individual MCL:

(i) For systems monitoring quarterly, divide the sum of the measured quarterly concentrations for each analyte by the number of quarters samples were collected for that analyte during the consecutive quarters included in the calculation. If more than one compliance sample for that analyte is available in a quarter because a confirmation sample was required by the State, systems must average all the results in a quarter then average the quarterly averages. Rounding does not occur until the end of the calculation. If the running annual average exceeds the MCL, the system is not in compliance with the MCL requirements.

(ii) For systems monitoring annually, if the concentration measured is equal to or exceeds an MCL for regulated PFAS, the system is required to initiate quarterly monitoring for all regulated PFAS beginning in the next quarter at the sampling point, with the triggering sample result used as the first quarter of monitoring for the running annual average calculation.

(iii) For systems monitoring triennially, if the concentration measured is equal to or exceeds the trigger level, the system is required to initiate quarterly monitoring for all regulated PFAS beginning in the next quarter at the sampling point, with the triggering sample result used as the first quarter of monitoring for the running annual average calculation.

(iv) For the purpose of calculating MCL compliance, if a sample result is less than the practical quantitation level (PQL) for a regulated PFAS, in accordance with the following table, zero is used for that analyte solely to calculate the running annual average.

TABLE 1 TO PARAGRAPH (f)(1)(iv)—PRACTICAL QUANTITATION LEVELS (PQLs) FOR PFAS CONTAMINANTS

Contaminant	PQL (in parts per trillion)
HFPO-DA	5.0

Contaminant	PQL (in parts per trillion)
PFBS	3.0
PFHxS	3.0
PFNA	4.0
PFOA	4.0
PFOS	4.0

(2) For each PFAS regulated under the Hazard Index MCL:

- (i) For systems monitoring quarterly, divide the observed sample analytical result for each analyte included in the Hazard Index by the corresponding HBWC listed in § 141.61(c) to obtain a hazard quotient for each analyte for each sampling event at each sampling point. Sum the resulting hazard quotients together to determine the Hazard Index for the quarter. If the State requires a confirmation sample for an analyte in the quarter, systems must average these results for each analyte in that quarter and then determine the hazard quotient(s) from those average values, then sum the hazard quotients. Once the Hazard Indices for the individual quarters are calculated, they are averaged to determine a running annual average. If the running annual average Hazard Index exceeds the MCL and two or more Hazard Index analytes had an observed sample analytical result at or above the PQL in any of the quarterly samples collected to determine the running annual average, the system is in violation of the Hazard Index MCL. No rounding occurs until after the running annual average Hazard Index is calculated.
- (ii) If the Hazard Index calculated using the results of an annual sample equals or exceeds the Hazard Index MCL, the system must initiate quarterly sampling for all regulated PFAS beginning in the next quarter at the sampling point, with the triggering sample result used as the first quarter of monitoring.
- (iii) If the Hazard Index calculated using the results of a triennial sample equals or exceeds the Hazard Index trigger level, the system must initiate quarterly sampling for all regulated PFAS beginning in the next quarter at the sampling point, with the triggering sample result used as the first quarter of monitoring.
- (iv) If a sample result is less than the practical quantitation level for a regulated PFAS, in accordance with the table 1 to paragraph (f)(1)(iv) of this section, zero is used for that analyte solely to calculate the running annual average.

**§ 141.904 Reporting and recordkeeping requirements.**

Systems required to sample must report to the State according to the timeframes and provisions of § 141.31 and retain records according to the provisions in § 141.33.

- (a) Systems must report the information from initial monitoring specified in the following table:

**TABLE 1 TO PARAGRAPH (a)—DATA TO REPORT FROM INITIAL MONITORING**

If you are a . . .	You must report . . .
System monitoring for regulated PFAS under the requirements of § 141.902(b)(1) on a quarterly basis	<ol style="list-style-type: none"> <li>1. All sample results, including the locations, number of samples taken at each location, dates, and concentrations reported.</li> <li>2. Whether a trigger level, defined in § 141.902(a)(5), was met or exceeded in any samples.</li> </ol>
System monitoring for regulated PFAS under the requirements of § 141.902(b)(1) less frequently than quarterly	<ol style="list-style-type: none"> <li>1. All sample results, including the locations, number of samples taken at each location, dates, and concentrations reported.</li> <li>2. Whether a trigger level, defined in § 141.902(a)(5), was met or exceeded in any samples.</li> </ol>

- (b) Systems must report the information collected during the compliance monitoring period specified in the following table:

**TABLE 2 TO PARAGRAPH (b)—DATA TO REPORT FROM COMPLIANCE MONITORING**

If you are a . . .	You must report . . .
System monitoring for regulated PFAS under the requirements of § 141.902(b)(2) on a quarterly basis	<ol style="list-style-type: none"> <li>1. All sample results, including the locations, number of samples taken at each location, dates, and concentrations during the previous quarter.</li> <li>2. The running annual average at each sampling point of all compliance samples.</li> <li>3. Whether a trigger level, defined in § 141.902(a)(5), was met or exceeded in any samples.</li> <li>4. Whether an MCL for a regulated PFAS in § 141.61(c) was met or exceeded in any samples.</li> <li>5. Whether, based on § 141.903, an MCL was violated.</li> </ol>
System monitoring for regulated PFAS under the requirements of § 141.902(b)(2) less frequently than quarterly	<ol style="list-style-type: none"> <li>1. All sample results, including the locations, number of samples taken at each location, dates, and concentrations during the previous monitoring period.</li> <li>2. Whether a trigger level, defined in § 141.902(a)(5), was met or exceeded in any samples.</li> <li>3. Whether an MCL for a regulated PFAS in § 141.61(c)</li> </ol>

If you are a . . .	You must report . . .
	<p>was met or exceeded in any samples.</p> <p>4. Whether, based on § 141.903, an MCL was violated (e.g., the results from a single sample are more than 4 times the MCL).</p>

## § 141.905 Violations.

- (a) PFAS MCL violations, both for the individual PFOA, PFOS, HFPO-DA, PFHxS, and PFNA MCLs, as well as the Hazard Index MCL, as listed in § 141.61(c), are based on a running annual average, as outlined under § 141.903.
- (b) Compliance with § 141.61(c) must be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.
- (c) Each failure to monitor in accordance with the requirements under § 141.902 is a monitoring violation.
- (d) Failure to notify the State following a MCL violation and failure to submit monitoring data in accordance with the requirements of §§ 141.904 and 141.31 are reporting violations.
- (e) Results for PFAS with individual MCLs as listed in § 141.61(c) are compared to their respective MCLs, and results for mixtures of two or more of the Hazard Index PFAS (HFPO-DA, PFBS, PFHxS, and PFNA) are compared to the Hazard Index MCL as listed in § 141.61(c). For determining compliance with the Hazard Index MCL, if only PFBS is reported at any concentration and no other regulated PFAS are in the mixture, it is not violation of the Hazard Index MCL. If only one of the other PFAS within the Hazard Index (HFPO-DA, PFHxS, and PFNA) is detected and the level of this PFAS exceeds its MCL as determined by § 141.903(f)(1)(i), only an individual MCL violation is assessed for the individual PFAS detected, and it is not a violation of the Hazard Index MCL. Exceedances of the Hazard Index caused by two or more of the Hazard Index PFAS (HFPO-DA, PFBS, PFHxS, and PFNA) and exceedances of one or more individual MCLs can result in multiple MCL exceedances. However, in this instance, for purposes of public notification under appendix A to subpart Q of this part, a PWS must only report the Hazard Index MCL exceedance.