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**§ 140.5 Analytical procedures.**

In determining the composition and quality of effluent discharge from marine sanitation devices, the procedures contained in 40 CFR part 136, ''Guidelines Establishing Test Procedures for the Analysis of Pollutants,'' or subsequent revisions or amendments thereto, shall be employed.

# PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

## Subpart A—General

Sec.
141.1 Applicability.
141.2 Definitions.
141.3 Coverage.
141.4 Variances and exemptions.
141.5 Siting requirements.
141.6 Effective dates.

## Subpart B—Maximum Contaminant Levels

141.11 Maximum contaminant levels for inorganic chemicals.
141.12 [Reserved]
141.13 Maximum contaminant levels for turbidity.

## Subpart C—Monitoring and Analytical Requirements

141.21 Coliform sampling.
141.22 Turbidity sampling and analytical requirements.
141.23 Inorganic chemical sampling and analytical requirements.
141.24 Organic chemicals, sampling and analytical requirements.
141.25 Analytical methods for radioactivity.
141.26 Monitoring frequency and compliance requirements for radionuclides in community water systems
141.27 Alternate analytical techniques.
141.28 Certified laboratories.
141.29 Monitoring of consecutive public water systems.

## Subpart D—Reporting and Recordkeeping

141.31 Reporting requirements.
141.32 [Reserved]
141.33 Record maintenance.
141.34 [Reserved]
141.35 Reporting of unregulated contaminant monitoring results.

## Subpart E—Special Regulations, Including Monitoring Regulations and Prohibition on Lead Use

141.40 Monitoring requirements for unregulated contaminants.
141.41 Special monitoring for sodium.
141.42 Special monitoring for corrosivity characteristics.
141.43 Prohibition on use of lead pipes, solder, and flux.

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

141.50 Maximum contaminant level goals for organic contaminants.
141.51 Maximum contaminant level goals for inorganic contaminants.
141.52 Maximum contaminant level goals for microbiological contaminants.
141.53 Maximum contaminant level goals for disinfection byproducts.
141.54 Maximum residual disinfectant level goals for disinfectants.
141.55 Maximum contaminant level goals for radionuclides.

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

141.60 Effective dates.
141.61 Maximum contaminant levels for organic contaminants.
141.62 Maximum contaminant levels for inorganic contaminants.
141.63 Maximum contaminant levels (MCLs) for microbiological contaminants.
141.64 Maximum contaminant levels for disinfection byproducts.
141.65 Maximum residual disinfectant levels.
141.66 Maximum contaminant levels for radionuclides.

## Subpart H—Filtration and Disinfection

141.70 General requirements.
141.71 Criteria for avoiding filtration.
141.72 Disinfection.
141.73 Filtration.
141.74 Analytical and monitoring requirements.
141.75 Reporting and recordkeeping requirements.
141.76 Recycle provisions.

## Subpart I—Control of Lead and Copper

141.80 General requirements.
141.81 Applicability of corrosion control treatment steps to small, medium-size and large water systems.
141.82 Description of corrosion control treatment requirements.
141.83 Source water treatment requirements.
141.84 Lead service line replacement requirements.

141.85 Public education and supplemental monitoring requirements.
141.86 Monitoring requirements for lead and copper in tap water.
141.87 Monitoring requirements for water quality parameters.
141.88 Monitoring requirements for lead and copper in source water.
141.89 Analytical methods.
141.90 Reporting requirements.
141.91 Recordkeeping requirements.

## Subpart J—Use of Non-Centralized Treatment Devices

141.100 Criteria and procedures for public water systems using point-of-entry devices.
141.101 Use of bottled water.

## Subpart K—Treatment Techniques

141.110 General requirements.
141.111 Treatment techniques for acrylamide and epichlorohydrin.

## Subpart L—Disinfectant Residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors

141.130 General requirements.
141.131 Analytical requirements.
141.132 Monitoring requirements.
141.133 Compliance requirements.
141.134 Reporting and recordkeeping requirements.
141.135 Treatment technique for control of disinfection byproduct (DBP) precursors.

## Subparts M–N [Reserved]

## Subpart O—Consumer Confidence Reports

141.151 Purpose and applicability of this subpart.
141.152 Effective dates.
141.153 Content of the reports.
141.154 Required additional health information.
141.155 Report delivery and recordkeeping.
APPENDIX A TO SUBPART O OF PART 141—REGULATED CONTAMINANTS

## Subpart P—Enhanced Filtration and Disinfection—Systems Serving 10,000 or More People

141.170 General requirements.
141.171 Criteria for avoiding filtration.
141.172 Disinfection profiling and benchmarking.
141.173 Filtration.
141.174 Filtration sampling requirements.
141.175 Reporting and recordkeeping requirements.

## Subpart Q—Public Notification of Drinking Water Violations

141.201 General public notification requirements.
141.202 *Tier 1 Public Notice*—Form, manner, and frequency of notice.
141.203 *Tier 2 Public Notice*—Form, manner, and frequency of notice.
141.204 *Tier 3 Public Notice*—Form, manner, and frequency of notice.
141.205 Content of the public notice.
141.206 Notice to new billing units or new customers.
141.207 Special notice of the availability of unregulated contaminant monitoring results.
141.208 Special notice for exceedance of the SMCL for fluoride.
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).
141.210 Notice by primacy agency on behalf of the public water system.
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.
APPENDIX A TO SUBPART Q OF PART 141—NPDWR VIOLATIONS AND SITUATIONS REQUIRING PUBLIC NOTICE
APPENDIX B TO SUBPART Q OF PART 141—STANDARD HEALTH EFFECTS LANGUAGE FOR PUBLIC NOTIFICATION
APPENDIX C TO SUBPART Q OF PART 141—LIST OF ACRONYMS USED IN PUBLIC NOTIFICATION REGULATION

## Subparts R–S [Reserved]

## Subpart T—Enhanced Filtration and Disinfection—Systems Serving Fewer Than 10,000 People

GENERAL REQUIREMENTS
141.500 General requirements.
141.501 Who is subject to the requirements of subpart T?
141.502 When must my system comply with these requirements?
141.503 What does subpart T require?
FINISHED WATER RESERVOIRS
141.510 Is my system subject to the new finished water reservoir requirements?
141.511 What is required of new finished water reservoirs?
ADDITIONAL WATERSHED CONTROL REQUIREMENTS FOR UNFILTERED SYSTEMS
141.520 Is my system subject to the updated watershed control requirements?

141.521 What updated watershed control requirements must my unfiltered system implement to continue to avoid filtration?
141.522 How does the State determine whether my system's watershed control requirements are adequate?

DISINFECTION PROFILE

141.530 What is a disinfection profile and who must develop one?
141.531 What criteria must a State use to determine that a profile is unnecessary?
141.532 How does my system develop a disinfection profile and when must it begin?
141.533 What data must my system collect to calculate a disinfection profile?
141.534 How does my system use this data to calculate an inactivation ratio?
141.535 What if my system uses chloramines, ozone, or chlorine dioxide for primary disinfection?
141.536 My system has developed an inactivation ratio; what must we do now?

DISINFECTION BENCHMARK

141.540 Who has to develop a disinfection benchmark?
141.541 What are significant changes to disinfection practice?
141.542 What must my system do if we are considering a significant change to disinfection practices?
141.543 How is the disinfection benchmark calculated?
141.544 What if my system uses chloramines, ozone, or chlorine dioxide for primary disinfection?

COMBINED FILTER EFFLUENT REQUIREMENTS

141.550 Is my system required to meet subpart T combined filter effluent turbidity limits?
141.551 What strengthened combined filter effluent turbidity limits must my system meet?
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?
141.553 My system practices lime softening—is there any special provision regarding my combined filter effluent?

INDIVIDUAL FILTER TURBIDITY REQUIREMENTS

141.560 Is my system subject to individual filter turbidity requirements?
141.561 What happens if my system's turbidity monitoring equipment fails?
141.562 My system only has two or fewer filters—is there any special provision regarding individual filter turbidity monitoring?
141.563 What follow-up action is my system required to take based on continuous turbidity monitoring?
141.564 My system practices lime softening—is there any special provision regarding my individual filter turbidity monitoring?

REPORTING AND RECORDKEEPING REQUIREMENTS

141.570 What does subpart T require that my system report to the State?
141.571 What records does subpart T require my system to keep?

**Subpart U—Initial Distribution System Evaluations**

141.600 General requirements.
141.601 Standard monitoring.
141.602 System specific studies.
141.603 40/30 certification.
141.604 Very small system waivers.
141.605 Subpart V compliance monitoring location recommendations.

**Subpart V—Stage 2 Disinfection Byproducts Requirements**

141.620 General requirements.
141.621 Routine monitoring.
141.622 Subpart V monitoring plan.
141.623 Reduced monitoring.
141.624 Additional requirements for consecutive systems.
141.625 Conditions requiring increased monitoring.
141.626 Operational evaluation levels.
141.627 Requirements for remaining on reduced TTHM and HAA5 monitoring based on subpart L results.
141.628 Requirements for remaining on increased TTHM and HAA5 monitoring based on subpart L results.
141.629 Reporting and recordkeeping requirements.

**Subpart W—Enhanced Treatment for *Cryptosporidium***

GENERAL REQUIREMENTS

141.700 General requirements.

SOURCE WATER MONITORING REQUIREMENTS

141.701 Source water monitoring.
141.702 Sampling schedules.
141.703 Sampling locations.
141.704 Analytical methods.
141.705 Approved laboratories.
141.706 Reporting source water monitoring results.
141.707 Grandfathering previously collected data.

DISINFECTION PROFILING AND BENCHMARKING REQUIREMENTS

141.708 Requirements when making a significant change in disinfection practice.
141.709 Developing the disinfection profile and benchmark.

TREATMENT TECHNIQUE REQUIREMENTS

141.710 Bin classification for filtered systems.
141.711 Filtered system additional *Cryptosporidium* treatment requirements.
141.712 Unfiltered system *Cryptosporidium* treatment requirements.
141.713 Schedule for compliance with *Cryptosporidium* treatment requirements.
141.714 Requirements for uncovered finished water storage facilities.

REQUIREMENTS FOR MICROBIAL TOOLBOX COMPONENTS

141.715 Microbial toolbox options for meeting *Cryptosporidium* treatment requirements.
141.716 Source toolbox components.
141.717 Pre-filtration treatment toolbox components.
141.718 Treatment performance toolbox components.
141.719 Additional filtration toolbox components.
141.720 Inactivation toolbox components.

REPORTING AND RECORDKEEPING REQUIREMENTS

141.721 Reporting requirements.
141.722 Recordkeeping requirements.

REQUIREMENTS FOR SANITARY SURVEYS PERFORMED BY EPA

141.723 Requirements to respond to significant deficiencies identified in sanitary surveys performed by EPA.

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 promulation 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*, is the concentration of lead or copper in water specified in §141.80(c) which determines, in some cases, the treatment requirements contained in subpart I of this part that a water system is required to complete.

*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.

*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.

*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 *CTcalc* is the product of ''residual disinfectant concentration'' (C) in mg/1 determined before or at the first customer, and the corresponding ''disinfectant contact time'' (T) in minutes, *i.e.*, ''C'' x ''T''. If a public water system applies disinfectants at more than one point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or ''total inactivation ratio.'' In determining the total inactivation ratio, the public water system must determine the residual disinfectant concentration of each disinfection sequence and corresponding contact time before any subsequent disinfection application point(s). ''$CT_{99.9}$'' is the CT value required for 99.9 percent (3–log) inactivation of *Giardia lamblia* cysts. $CT_{99.9}$ for a variety of disinfectants and conditions appear in tables 1.1–1.6, 2.1, and 3.1 of § 141.74(b)(3).

$$\frac{\text{CTcalc}}{\text{CT}_{99.9}}$$

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

$$\sum \frac{(\text{CTcalc})}{\left(\text{CT}_{99.9}\right)}$$

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 membrance (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.

*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.

*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.

*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 draw sample* means a one-liter sample of tap water, collected in accordance with §141.86(b)(2), that has been standing in plumbing pipes at least 6 hours and is collected without flushing the tap.

*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.

*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.

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

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

*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 permissable 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-size water system*, for the purpose of subpart I of this part only, means a water system that serves greater than 3,300 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.

*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.

*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*, 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 insuring that the treatment does not cause the water system to violate any national primary drinking water regulations.

*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.

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

*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 (POU)* is a treatment device applied to a single tap used for the purpose of reducing contaminants in drinking water at that one tap.

*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.

*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 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.

*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 sample* means a one-liter sample of water collected in accordance with §141.86(b)(3), that has been standing for at least 6 hours in a service line.

*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 3,300 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 ($UV_{254}$) (in $m^{=1}$) 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.

*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.

[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 on GPO Access.

### § 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 MCL for total coliforms 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.

[54 FR 27562, June 29, 1989, as amended at 56 FR 1557, Jan. 15, 1991; 63 FR 43846, Aug. 14, 1998]

### § 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 (k) of this section, and in § 141.80(a)(2), the regulations set forth in this part shall 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.

[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]

## 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:

EDITORIAL NOTE: At 54 FR 27527, June 29, 1989, § 141.13 was amended by adding introductory text, effective December 31, 1990. However, introductory text already exists. The added text follows.

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 § 1412(b)(7)(C)(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 § 1412(b)(7)(C)(iii), must install filtration, until June 29, 1993, or until filtration is installed, whichever is later.

(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 [1] | 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 |

TOTAL COLIFORM MONITORING FREQUENCY FOR COMMUNITY WATER SYSTEMS—Continued

| Population served | Minimum number of samples per month |
|---|---|
| 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 |
| 3,960,001 or more | 480 |

[1] 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.

(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.

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

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.*

[1] *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.

[2] 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.

[3] 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.

[4] 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.

[5] No requirement exists to run the completed phase on 10 percent of all total coliform-positive confirmed tubes.

[6] 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.

[7] Six-times formulation strength may be used if the medium is filter-sterilized rather than autoclaved.

[8] The ONPG-MUG Test is also known as the Autoanalysis Collect System.

[9] 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.

[10] 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.

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

[12] 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 β-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).

[13] 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 *Escherichla coli* in Finished Waters'', November 2000, Version 1.0, available from EM Science (an affiliate of Merck KGgA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027–1297. Telephone number is (800) 222–0342, e-mail address is: *adellenbusch@emscience.com.*

[14] 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 *Escherichla coli* in Finished Waters'', November 2000, Version 1.0, available from EM Science (an affiliate of Merck KGgA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027–1297. Telephone number is (800) 222–0342, e-mail address is: *adellenbusch@emscience.com.*

[15] 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 ±0.2 °C for 24 ±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:

(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 ±0.2 °C for 24 ±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.*

(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.

[54 FR 27562, June 29, 1989, as amended at 54 FR 30001, July 17, 1989; 55 FR 25064, June 19, 1990; 56 FR 642, Jan. 8, 1991; 57 FR 1852, Jan. 15, 1992; 57 FR 24747, June 10, 1992; 59 FR 62466, Dec. 5, 1994; 60 FR 34085, June 29, 1995; 64 FR 67461, Dec. 1, 1999; 65 FR 26022, May 4, 2000; 67 FR 65246, Oct. 23, 2002; 67 FR 65896, Oct. 29, 2002; 69 FR 7160, Feb. 13, 2004]

### § 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[5] |
| | | ICP-Mass Spectrometry | 0.0004 |
| | | Hydride-Atomic Absorption | 0.001 |
| Arsenic | 0.010[6] | Atomic Absorption; Furnace | 0.001 |
| | | Atomic Absorption; Platform—Stabilized Temperature | 0.0005[7] |
| | | Atomic Absorption; Gaseous Hydride | 0.001 |
| | | ICP-Mass Spectrometry | 0.0014[8] |
| Asbestos | 7 MFL[1] | 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[5] |
| | | Inductively Coupled Plasma[2] | 0.0003 |
| | | ICP-Mass Spectrometry | 0.0003 |
| Cadmium | 0.005 | 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[3] | 0.02 |
| | | Distillation, Automated, Spectrophotometric[3] | 0.005 |
| | | Distillation, Amenable, Spectrophotometric[4] | 0.02 |
| | | Distillation, Selective Electrode[3] | 0.05 |
| | | UV, Distillation, Spectrophotometric | 0.0005 |
| | | Distillation, Spectrophotometric | 0.0006 |
| Mercury | 0.002 | Manual Cold Vapor Technique | 0.0002 |
| | | Automated Cold Vapor Technique | 0.0002 |
| Nickel | xl | Atomic Absorption; Furnace | 0.001 |
| | | Atomic Absorption; Platform | 0.0006[5] |
| | | Inductively Coupled Plasma[2] | 0.005 |
| | | ICP-Mass Spectrometry | 0.0005 |
| Nitrate | 10 (as N) | Manual Cadmium Reduction | 0.01 |
| | | Automated Hydrazine Reduction | 0.01 |
| | | Automated Cadmium Reduction | 0.05 |
| | | Ion Selective Electrode | 1 |
| | | Ion Chromatography | 0.01 |
| Nitrite | 1 (as N) | Spectrophotometric | 0.01 |
| | | Automated Cadmium Reduction | 0.05 |
| | | Manual Cadmium Reduction | 0.01 |
| | | Ion Chromatography | 0.004 |
| Selenium | 0.05 | Atomic Absorption; furnace | 0.002 |
| | | Atomic Absorption; gaseous hydride | 0.002 |
| Thallium | 0.002 | Atomic Absorption; Furnace | 0.001 |
| | | Atomic Absorption; Platform | 0.0007[5] |
| | | ICP-Mass Spectrometry | 0.0003 |

[1] MFL = million fibers per liter >10 μm.
[2] Using a 2X preconcentration step as noted in Method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.
[3] Screening method for total cyanides.
[4] Measures "free" cyanides.

[5] Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.
[6] The value for arsenic is effective January 23, 2006. Unit then, the MCL is 0.05 mg/L.
[7] 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.
[8] Using selective ion monitoring, EPA Method 200.8 (ICP-MS) is capable of obtaining a MDL of 0.0001 mg/L.

(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 ≥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 ≥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 ≥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 nitrate 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 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 also contains approved analytical test methods which remain available for compliance monitoring until July 1, 1996. These methods will not be available for use after July 1, 1996. This document is available from the National Technical Information Service, NTIS PB95–104766, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800–553–6847.

| Contaminant and methodology [13] | EPA | ASTM [3] | SM [4] (18th, 19th ed.) | SM [4] (20th ed.) | Other |
|---|---|---|---|---|---|
| 1. Alkalinity: | | | | | |
| Titrimetric | ..... | D1067–92B. | 2320 B ..... | 2320 B | |
| Electrometric titration | ..... | ..... | ..... | ..... | I–1030–85 [5] |
| 2. Antimony: | | | | | |
| Inductively Coupled Plasma (ICP)—Mass Spectrometry. | 200.8 [2]. | | | | |
| Hydride-Atomic Absorption | ..... | D3697–92 | | | |
| Atomic Absorption; Platform | 200.9 [2] | | | | |

| Contaminant and methodology [13] | EPA | ASTM [3] | SM [4] (18th, 19th ed.) | SM [4] (20th ed.) | Other |
|---|---|---|---|---|---|
| Atomic Absorption; Furnace | | | 3113 B | | |
| 3. Arsenic: [14] | | | | | |
| Inductively Coupled Plasma [15] | 200.7 [2] | | 3120 B | 3120 B | |
| ICP-Mass Spectrometry | 200.8 [2]. | | | | |
| Atomic Absorption; Platform | 200.9 [2]. | | | | |
| Atomic Absorption; Furnace | | D2972–97C. | 3113 B | | |
| Hydride Atomic Absorption | | D2972–97B. | 3114 B | | |
| 4. Asbestos: | | | | | |
| Transmission Electron Microscopy | 100.1 [9]. | | | | |
| Transmission Electron Microscopy | 100.2 [10]. | | | | |
| 5. Barium: | | | | | |
| Inductively Coupled Plasma | 200.7 [2] | | 3120 B | 3120 B | |
| ICP-Mass Spectrometry | 200.8 [2]. | | | | |
| Atomic Absorption; Direct | | | 3111 D | | |
| Atomic Absorption; Furnace | | | 3113 B | | |
| 6. Beryllium: | | | | | |
| Inductively Coupled Plasma | 200.7 [2] | | 3120 B | 3120 B | |
| ICP-Mass Spectrometry | 200.8 [2]. | | | | |
| Atomic Absorption; Platform | 200.9 [2]. | | | | |
| Atomic Absorption; Furnace | | D3645–97B. | 3113 B | | |
| 7. Cadmium: | | | | | |
| Inductively Coupled Plasma | 200.7 [2] | | | | |
| ICP-Mass Spectrometry | 200.8 [2] | | | | |
| Atomic Absorption; Platform | 200.9 [2] | | | | |
| Atomic Absorption; Furnace | | | 3113 B. | | |
| 8. Calcium: | | | | | |
| EDTA titrimetric | | D511–93A | 3500–Ca D. | 3500–Ca B. | |
| Atomic Absorption; Direct Aspiration | | D511–93B | 3111 B. | | |
| Inductively Coupled Plasma | 200.7 [2] | | 3120 B | 3120 B. | |
| 9. Chromium: | | | | | |
| Inductively Coupled Plasma | 200.7 [2] | | 3120 B | 3120 B. | |
| ICP-Mass Spectrometry | 200.8 [2]. | | | | |
| Atomic Absorption; Platform | 200.9 [2]. | | | | |
| Atomic Absorption; Furnace | | | 3113 B. | | |
| 10. Copper: | | | | | |
| Atomic Absorption; Furnace | | D1688–95C. | 3113 B. | | |
| Atomic Absorption; Direct Aspiration | | D1688–95A. | 3111 B. | | |
| Inductively Coupled Plasma | 200.7 [2] | | 3120 B | 3120 B. | |
| ICP-Mass spectrometry | 200.8 [2]. | | | | |
| Atomic Absorption; Platform | 200.9 [2]. | | | | |
| 11. Conductivity: | | | | | |
| Conductance | | D1125–95A. | 2510 B | 2510 B. | |
| 12. Cyanide: | | | | | |
| Manual Distillation followed by | | D2036–98A. | 4500–$CN^-$ C. | 4500–$CN^-$ C. | |
| Spectrophotometric Manual | | D2036–98A. | 4500–$CN^-$ E. | 4500–$CN^-$ E. | I–3300-85 [5] |
| Spectrophotometric Semi-automated | 335.4 [6]. | | | | |
| Spectrophotometric, Amenable | | D2036–98B. | 4500–$CN^-$ G. | 4500–$CN^-$ G. | |
| Selective Electrode | | | 4500–$CN^-$ F. | 4500–$CN^-$ F. | |
| UV/Distillation/Spectrophotometric | | | | | Kelada 01 [17] |
| Distillation/Spectrophotometric | | | | | QuikChem 10–204–00–1–X [18] |
| 13. Fluoride: | | | | | |
| Ion Chromatography | 300.0 [6] | D4327–97 | 4110 B | 4110 B. | |
| Manual Distill.; Color. SPADNS | | | 4500–$F^-$ B,D. | 4500–$F^-$ B,D. | |
| Manual Electrode | | D1179–93B. | 4500–$F^-$ C. | 4500–$F^-$ C. | |
| Automated Electrode | | | | | 380–75WE [11] |

| Contaminant and methodology [13] | EPA | ASTM [3] | SM [4] (18th, 19th ed.) | SM [4] (20th ed.) | Other |
|---|---|---|---|---|---|
| Automated Alizarin | | | 4500–$F^-$ E. | 4500–$F^-$ E. | 29–71W [11] |
| 14. Lead: | | | | | |
| Atomic Absorption; Furnace | | D3559–96D. | 3113 B. | | |
| ICP-Mass spectrometry | 200.8 [2]. | | | | |
| Atomic Absorption; Platform | 200.9 [2]. | | | | |
| Differential Pulse Anodic Stripping Voltammetry | | | | | Method 1001 [16] |
| 15. Magnesium: | | | | | |
| Atomic Absorption | | D511–93 B | 3111 B. | | |
| ICP | 200.7 [2] | | 3120 B | 3120 B. | |
| Complexation Titrimetric Methods | | D511–93 A | 3500–Mg E. | 3500–Mg B. | |
| 16. Mercury: | | | | | |
| Manual, Cold Vapor | 245.1 [2] | D3223–97 | 3112 B. | | |
| Automated, Cold Vapor | 245.2 [1]. | | | | |
| ICP-Mass Spectrometry | 200.8 [2]. | | | | |
| 17. Nickel: | | | | | |
| Inductively Coupled Plasma | 200.7 [2] | | 3120 B | 3120 B. | |
| ICP-Mass Spectrometry | 200.8 [2]. | | | | |
| Atomic Absorption; Platform | 200.9 [2]. | | | | |
| Atomic Absorption; Direct | | | 3111 B. | | |
| Atomic Absorption; Furnace | | | 3113 B. | | |
| 18. Nitrate: | | | | | |
| Ion Chromatography | 300.0 [6] | D4327–97 | 4110 B | 4110 B | B–1011 [8] |
| Automated Cadmium Reduction | 353.2 [6] | D3867–90A. | 4500–$NO_3^-$ F. | 4500–$NO_3^-$ F. | |
| Ion Selective Electrode | | | 4500–$NO_3^-$ D. | 4500–$NO_3^-$ D. | 601 [7] |
| Manual Cadmium Reduction | | D3867–90B. | 4500–$NO_3^-$ E. | 4500–$NO_3^-$ E. | |
| 19. Nitrite: | | | | | |
| Ion Chromatography | 300.0 [6] | D4327–97 | 4110 B | 4110 B | B–1011 [8] |
| Automated Cadmium Reduction | 353.2 [6] | D3867–90A. | 4500–$NO_3^-$. | 4500–$NO_3^-$ F. | |
| Manual Cadmium Reduction | | D3867–90B. | 4500–$NO_3^-$ E. | 4500–$NO_3^-$ E. | |
| Spectrophotometric | | | 4500–$NO_2^-$ B. | 4500–$NO_2^-$ B. | |
| 20. Ortho-phosphate: [12] | | | | | |
| Colorimetric, Automated, Ascorbic Acid | 365.1 [6] | | 4500–P F | 4500–P F. | |
| Colorimetric, ascorbic acid, single reagent | | D515–88A | 4500–P E | 4500–P E. | |
| Colorimetric Phosphomolybdate; | | | | | I–1601–85 [5] |
| Automated-segmented Flow; | | | | | I–2601–90 [5] |
| Automated Discrete | | | | | I–2598–85 [5] |
| Ion Chromatography | 300.0 [6] | D4327–97 | 4110 B | 4110 B. | |
| 21. pH: | | | | | |
| Electrometric | 150.1 [1] 150.2 [1]. | D1293–95 | 4500–$H^+$ B | 4500–$H^+$ B. | |
| 22. Selenium: | | | | | |
| Hydride-Atomic Absorption | | D3859–98A. | 3114 B. | | |
| ICP-Mass Spectrometry | 200.8 [2]. | | | | |
| Atomic Absorption; Platform | 200.9 [2]. | | | | |
| Atomic Absorption; Furnace | | D3859–98B. | 3113 B. | | |
| 23. Silica: | | | | | |
| Colorimetric, Molybdate Blue; | | | | | I–1700–85 [5] |
| Automated-segmented Flow | | | | | I–2700–85 [5] |
| Colorimetric | | D859–95. | | | |
| Molybdosilicate | | | 4500–Si D | 4500–$SiO_2$ C. | |
| Heteropoly Blue | | | 4500–Si E | 4500–$SiO_2$ D. | |
| Automated for Molybdate-reactive Silica | | | 4500–Si F | 4500–$SiO_2$ E. | |

| Contaminant and methodology [13] | EPA | ASTM [3] | SM [4] (18th, 19th ed.) | SM [4] (20th ed.) | Other |
|---|---|---|---|---|---|
| Inductively Coupled Plasma | 200.7 [2] | | 3120 B | 3120 B. | |
| 24. Sodium: | | | | | |
| Inductively Coupled Plasma | 200.7 [2]. | | | | |
| Atomic Absorption; Direct Aspiration | | | 3111 B. | | |
| 25. Temperature: | | | | | |
| Thermometric | | | 2550 | 2550. | |
| 26. Thallium: | | | | | |
| ICP-Mass Spectrometry | 200.8 [2]. | | | | |
| Atomic Absorption; Platform | 200.9 [2]. | | | | |

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 and 16 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 B135, 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.*

[1] "Methods for Chemical Analysis of Water and Wastes", EPA/600/4–79/020, March 1983. Available at NTIS, PB84–128677.

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

[3] *Annual Book of ASTM Standards,* 1994, 1996, or 1999, Vols. 11.01 and 11.02, ASTM International; any year containing the cited version of the method may be used. The previous versions of D1688–95A, D1688–95C (copper), D3559–95D (lead), D1293–95 (pH), D1125–91A (conductivity) and D859–94 (silica) are also approved. These previous versions D1688–90A, C; D3559–90D, D1293–84, D1125–91A and D859–88, respectively are located in the *Annual Book of ASTM Standards,* 1994, Vol. 11.01. Copies may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

[4] 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, except that the versions of 3111 B, 3111 D, 3113 B and 3114 B in the 20th edition may not be used.

[5] Method I–2601–90, 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; For Methods I–1030–85; I–1601–85; I–1700–85; I–2598–85; I–2700–85; and I–3300–85 See Techniques of Water Resources Investigation of the U.S. Geological Survey, Book 5, Chapter A–1, 3rd ed., 1989; Available from Information Services, U.S. Geological Survey, Federal Center, Box 25286, Denver, CO 80225–0425.

[6] "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA/600/R–93/100, August 1993. Available at NTIS, PB94–120821.

[7] 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.

[8] 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.

[9] 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.

[10] Method 100.2, "Determination of Asbestos Structure Over 10 μm In Length In Drinking Water", EPA/600/R–94/134, June 1994. Available at NTIS, PB94–201902.

[11] 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.

[12] Unfiltered, no digestion or hydrolysis.

[13] 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.

[14] If ultrasonic nebulization is used in the determination of arsenic by Methods 200.7, 200.8, or SM 3120 B, the arsenic must be in the pentavalent state to provide uniform signal response. For methods 200.7 and 3120 B, both samples and standards must be diluted in the same mixed acid matrix concentration of nitric and hydrochloric acid with the addition of 100 μL of 30% hydrogen peroxide per 100ml of solution. For direct analysis of arsenic with method 200.8 using ultrasonic nebulization, samples and standards must contain one mg/L of sodium hypochlorite.

[15] Starting January 23, 2006, analytical methods using the ICP-AES technology, may not be used because the detection limits for these methods are 0.008 mg/L or higher. This restriction means that the two ICP-AES methods (EPA Method 200.7 and SM 3120 B) approved for use for the MCL of 0.05 mg/L may not be used for compliance determinations for the revised MCL of 0.010 mg/L. However, prior to January 23, 2006, systems may have compliance samples analyzed with these less sensitive methods.

[16] 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.

[17] 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.

[18] 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, USA. Phone: 414–358–4200.

(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 [1] | Container [2] | Time [3] |
|---|---|---|---|
| Antimony | $HNO^3$ | P or G | 6 months |
| Arsenic | Conc $HNO_3$ to pH <2. | P or G | 6 months |
| Asbestos | 4 °C | P or G | 48 hours [4] |
| Barium | $HNO^3$ | P or G | 6 months |
| Beryllium | $HNO^3$ | P or G | 6 months |
| Cadmium | $HNO^3$ | P or G | 6 months |
| Chromium | $HNO^3$ | P or G | 6 months |
| Cyanide | 4 °C, NaOH | P or G | 14 days |
| Fluoride | None | P or G | 1 month |
| Mercury | $HNO^3$ | P or G | 28 days |
| Nickel | $HNO^3$ | P or G | 6 months |
| Nitrate | 4 °C | P or G | 48 hours [5] |
| Nitrate-Nitrite [6] | $H^2SO^4$ | P or G | 28 days |
| Nitrite | 4°C | P or G | 48 hours |
| Selenium | $HNO^3$ | P or G | 6 months |
| Thallium | $HNO^3$ | P or G | 6 months |

[1] For cyanide determinations samples must be adjusted with sodium hydroxide to pH 12 at the time off 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.

[2] P=plastic, hard or soft; G=glass, hard or soft.

[3] 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.

[4] 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.

[5] If the sample is chlorinated, the holding time for an unacidified sample kept at 4 °C is extended to 14 days.

[6] 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, as amended at 56 FR 30274, July 1, 1991; 57 FR 31838, July 17, 1992; 59 FR 34322, July 1, 1994; 59 FR 62466, Dec. 5, 1994; 60 FR 33932, 34085, June 29, 1995; 64 FR 67461, Dec. 1, 1999; 65 FR 26022, May 4, 2000; 66 FR 7061, Jan. 22, 2001; 67 FR 65246, Oct. 23, 2002; 67 FR 65897, Oct. 29, 2002; 67 FR 68911, Nov. 13, 2002; 68 FR 14506, Mar. 25, 2003]

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

(a)–(d) [Reserved]

(e) Analyses for the contaminants in this section shall be conducted using the following EPA methods or their equivalent as approved 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 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*. 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 three editions may be used. The APHA documents are available from APHA, 1015 Fifteenth Street NW., Washington, D.C. 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 is available in the *Annual Book of ASTM Standards*, (1999), Vol. 11.02, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428, or in any edition published after 1993. 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 can be accessed and downloaded directly on-line at *www.epa.gov/safewater/methods/sourcalt.html*. The Syngenta AG–625, ''Atrazine in Drinking Water by Immunoassay'', February 2001 is available from Syngenta Crop Protection, Inc., 410 Swing Road, Post Office Box 18300, Greensboro, NC 27419, Phone number (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 on-line at *www.epa.gov/safewater/methods/sourcalt.html*.

| Contaminant | EPA method [1] | 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. | | | |
| 21. Xylenes (total) | 502.2, 524.2. | | | |
| 22. 2,3,7,8-TCDD (dioxin) | 1613. | | | |
| 23. 2,4-D [4] (as acid, salts and esters) | 515.2, 555, 515.1, 515.3, 515.4 | | D5317–93. | |
| 24. 2,4,5-TP [4] (Silvex) | 515.2, 555, 515.1, 515.3, 515.4 | | D5317–93. | |
| 25. Alachlor [2] | 507, 525.2, 508.1, 505, 551.1. | | | |
| 26. Atrazine [2] | 507, 525.2, 508.1, 505, 551.1 | | | Syngenta AG–625. |
| 27. Benzo(a)pyrene | 525.2, 550, 550.1. | | | |
| 28. Carbofuran | 531.1, 531.2 | 6610. | | |
| 29. Chlordane | 508, 525.2, 508.1, 505. | | | |
| 30. Dalapon | 552.1, 515.1, 552.2, 515.3, 515.4. | | | |
| 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 [4] | 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, 551.1. | | | |
| 38. Ethylene dibromide (EDB) | 504.1, 551.1. | | | |
| 39. Glyphosate | 547 | 6651. | | |
| 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. | | | |
| 46. Oxamyl | 531.1, 531.2 | 6610. | | |
| 47. PCBs [3] (as decachlorobiphenyl) | 508A. | | | |
| 48. PCBs [3] (as Aroclors) | 508.1, 508, 525.2, 505. | | | |
| 49. Pentachlorophenol | 515.2, 525.2, 555, 515.1, 515.3, 515.4 | | D5317–93. | |

| Contaminant | EPA method [1] | Standard methods | ASTM | Other |
|---|---|---|---|---|
| 50. Picloram [4] | 515.2, 555, 515.1, 515.3, 515.4 | | D5317–93. | |
| 51. Simazine [2] | 507, 525.2, 508.1, 505, 551.1. | | | |
| 52. Toxaphene | 508, 508.1, 525.2, 505. | | | |
| 53. Total Trihalomethanes | 502.2, 524.2, 551.1. | | | |

[1] For previously approved EPA methods which remain available for compliance monitoring until June 1, 2001, see paragraph (e)(2) of this section.
[2] 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.
[3] 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.
[4] 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.

(2) The following EPA methods will remain available for compliance monitoring until June 1, 2001. 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, 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*. EPA methods 502.2 Rev. 2.0, 505 Rev. 2.0, 507 Rev. 2.0, 508 Rev. 3.0, 531.1 Rev. 3.0 are in ''Methods for the Determination of Organic Compounds in Drinking Water'', December 1988, revised July 1991; methods 506 and 551 are in ''Methods for the Determination of Organic Compounds in Drinking Water—Supplement I'', July 1990; methods 515.2 Rev. 1.0 and 524.2 Rev. 4.0 are in ''Methods for the Determination of Organic Compounds in Drinking Water—Supplement II,'' August 1992; and methods 504.1 Rev. 1.0, 508.1 Rev. 1.0, 525.2 Rev.1.0 are available from US EPA NERL, Cincinnati, OH 45268

(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 contaiminant 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 ≥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 speci fied 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 ±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 ±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 ±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:[7]

(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

[7] Monitoring for the contaminants aldicarb, aldicarb sulfoxide, and aldicarb sulfone shall be conducted in accordance with §141.40.

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. Nonpoint 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 monitoring results in detection of one or more of certain related contaminants (aldicarb, aldicarb sulfone, aldicarb sulfoxide and heptachlor, 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 |

| Contaminant | Detection limit (mg/l) |
|---|---|
| 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) Anaylsis 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. |
| 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 on GPO Access.

### §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 their equivalent determined by EPA in accordance with §141.27.

| Contaminant | Methodology | Reference (method or page number) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPA [1] | EPA [2] | EPA [3] | EPA [4] | SM [5] | ASTM [6] | USGS [7] | DOE [8] | Other |
| Naturally occurring: | | | | | | | | | | |
| Gross alpha [11] and beta. | Evaporation | 900.0 | p 1 | 00–01 | p 1 | 302, 7110 B | | R–1120–76 | | |
| Gross alpha [11] | Co-precipitation | | | 00–02 | | 7110 C | | | | |
| Radium 226 | Radon emanation | 903.1 | p 16 | Ra–04 | p 19 | 305,7500–Ra C | D 3454–97 | R–1141–76 | Ra–04 | N.Y. [9] |
| | Radiochemi- cal | 903.0 | p 13 | Ra–03 | | 304,7500–Ra B | D 2460–97 | R–1140–76 | | |
| Radium 228 | Radiochemi- cal | 904.0 | p 24 | Ra–05 | p 19 | 7500–Ra D | | R–1142–76 | | N.Y., [9] N.J. [10] |
| Uranium [12] | Radiochemical | 908.0 | | | | 7500–U B | | | | |
| | Fluorometric | 908.1 | | | | 7500–U C (17th Ed.) | D 2907–97 | R–1180–76, R–1181–76. | U–04 | |
| | ICP-MS | 200.8 [13] | | | | 3125 | D 5673-03 | | | |
| | Alpha spectrometry | | | 00–07 | p 33 | 7500–UC (18th, 19th or 20th Ed.). | D 3972–97 | R–1182–76 | U–02. | |
| | Laser Phosphorimetry. | | | | | | D 5174–97. | | | |
| Man-made: | | | | | | | | | | |
| Radioact- ive cesium | Radiochemi- cal | 901.0 | p 4 | | | 7500–CsB | D 2459–72 | R–1111–76 | | |
| | Gamma ray spec- trometry. | 901.1 | | | p 92 | 7120 | D 3649–91 | R– 1110–76 | 4.5.2.3 | |
| Radioact- ive iodine | Radiochemi- cal | 902.0 | p 6, p 9 | | | 7500–I B, 7500–I C, 7500–I D. | D 3649–91. | | | |
| | Gamma ray spec- trometry. | 901.1 | | | p 92 | 7120 | D 4785–93 | | 4.5.2.3. | |
| Radioact- ive Strontium 89, 90. | Radiochemi- cal | 905.0 | p 29 | Sr–04 | p 65 | 303, 7500–Sr B | | R–1160–76 | Sr–01, Sr–02 | |
| Tritium | Liquid scintillation | 906.0 | p 34 | H–02 | p 87 | 306, 7500–3H B | D 4107–91 | R–1171–76. | | |
| Gamma emitters | Gamma ray | 901.1 | | | p 92 | 7120 | D 3649–91 | R–1110–76 | Ga–01–R | |
| | Spectrometry | 902.0, 901.0. | | | | 7500–Cs B, 7500–I B | D 4785–93. | | | |

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of documents 1 through 10 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 B135, 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.*

[1] "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, except Method 200.8, "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, PB95–125472.

[2] "Interim Radiochemical Methodology for Drinking Water", EPA 600/4–75–008 (revised), March 1976. Available at NTIS, ibid. PB 253258.

[3] "Radiochemistry Procedures Manual", EPA 520/5–84–006, December, 1987. Available at NTIS, ibid. PB 84–215581.

[4] "Radiochemical Analytical Procedures for Analysis of Environmental Samples", March 1979. Available at NTIS, ibid. EMSL LV 053917.

[5] "Standard Methods for the Examination of Water and Wastewater", 13th, 17th, 18th, 19th Editions, 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, 7500–3H 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. Methods 302, 303, 304, 305 and 306 are only in the 13th edition. Method 3125 is only in the 20th edition.

[6] *Annual Book of ASTM Standards,* Vol. 11.01 and 11.02, 1999; 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.

[7] "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.

[8] "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.

[9] "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.

[10] "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.

[11] 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.

[12] 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.

[13] "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.

(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 (1.96σ where σ 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. |
| Gross beta | 4 pCi/1. |
| 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]

## § 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 the 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 ½ 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 ½ 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 ½ 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 ½ 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 ½ 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 ½ 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% (1.65σ, where σ 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, ½ 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, ½ 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, 141.30, 141.40, 141.74 and 141.89, samples may be considered only if they have been analyzed by a laboratory certified by the State except that measurements for alkalinity, calcium, conductivity, 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]

### § 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.

## 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) 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 primacy agency a certification that it has fully complied with the public notification regulations. 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.

(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]

### § 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 of unregulated contaminant monitoring results.

(a) *Does this reporting apply to me?* (1) This section applies to any owner or operator of a public water system required to monitor for unregulated contaminants under § 141.40. This section requires you to report the results of this monitoring.

(2) *Exception*. You do not need to report results if you are a system serving a population of 10,000 or less, since EPA will arrange for testing and reporting of the results. However, you will still need to comply with consumer confidence reporting and public notification requirements for these results.

(b) *To whom must I report?* You must report the results of unregulated contaminant monitoring to EPA and provide a copy to the State. You must also notify the public of the monitoring results as provided in Subpart O (Consumer Confidence Reports) and Subpart Q (Public Notification) of this part.

(c) *When must I report monitoring results?* You must report the results of unregulated contaminant monitoring within thirty (30) days following the month in which you received the results from the laboratory. EPA will conduct its quality control review of the data for sixty (60) days after you report the data, which will also allow for quality control review by systems and States. After the quality control review, EPA will place the data in the national drinking water contaminant occurrence database at the time of the next database update. Exception: Reporting to EPA of monitoring results received by public water systems prior to May 13, 2002, must occur by August 9, 2002.

(d) *What information must I report?* (1) You must provide the following ''point of contact'' information: name, mailing address, phone number, and e-mail address for:

(i) PWS Technical Contact, the person at your PWS that is responsible for the technical aspects of your unregulated contaminant monitoring regulation (UCMR) activities, such as details concerning sampling and reporting;

(ii) PWS Official, the person at your PWS that is able to function as the official spokesperson for your UCMR activities; and

(iii) Laboratory Contact Person, the person at your laboratory that is able to address questions concerning the analysis that they provided for you.

(2) You must update this information if it changes during the course of UCMR implementation.

(3) You must report the information specified for data elements 1 through 16 in the following table for each sample.

TABLE 1—UNREGULATED CONTAMINANT MONITORING REPORTING REQUIREMENTS

| Data Element | Definition |
|---|---|
| 1. Public Water System (PWS) Identification Number. | The code used to identify each PWS. The code begins with the standard two-character postal State abbreviation; the remaining seven characters are unique to each PWS. |
| 2. Public Water System Facility Identification Number—Sampling Point Identification Number and Sampling Point Type Identification. | The Sampling point identification number and sampling point type identification must either be static or traceable to previous numbers and type identifications throughout the period of unregulated contaminant monitoring. The Sampling point identification number is a three-part alphanumeric designation, made up of:<br>a. The Public Water System Facility Identification Number is an identification number established by the State, or at the State's discretion the PWS, that is unique to the PWS for an intake for each source of water, a treatment plant, a distribution system, or any other facility associated with water treatment or delivery and provides for the relationship of facilities to each other to be maintained;<br>b. The Sampling Point Identification Number is an identification number established by the State, or at the State's discretion the PWS, that is unique to each PWS facility that identifies the specific sampling point and allows the relationship of the sampling point to other facilities to be maintained; and<br>c. Sampling Point Type Identification is one of following: |

TABLE 1—UNREGULATED CONTAMINANT MONITORING REPORTING REQUIREMENTS—Continued

| Data Element | Definition |
|---|---|
| | SR—Untreated water collected at the source of the water system facility.<br>EP—Entry point to the distribution system.<br>MD—midpoint in the distribution system where the disinfectant residual would be expected to be typical for the system such as the location for sampling coliform indicator bacteria as described in 40 CFR 141.21.<br>MR—point of maximum retention is the point located the furthest from the entry point to the distribution system which is approved by the State for trihalomethane (THM) (disinfectant byproducts (DBP)) and/or total coliform sampling.<br>LD—location in the distribution system where the disinfectant residual is the lowest which is approved by the State for THM (DBP) and/or total coliform sampling. |
| 3. Sample Collection Date | The date the sample is collected reported as 4-digit year, 2-digit month, and 2-digit day. |
| 4. Sample Identification Number | An alphanumeric value of up to 15 characters assigned by the laboratory to uniquely identify containers or groups of containers containing water samples collected at the same time and sampling point. |
| 5. Contaminant/Parameter | The unregulated contaminant or water quality parameter for which the sample is being analyzed. |
| 6. Analytical Results—Sign | An alphanumeric value indicating whether the sample analysis result was:<br>a. (<) ''less than'' means the contaminant was not detected or was detected at a level ''less than'' the MRL.<br>b. (=) ''equal to'' means the contaminant was detected at a level ''equal to'' the value reported in ''Analytical Result—Value.'' |
| 7. Analytical Result—Value | The actual numeric value of the analysis for chemical and microbiological results, or the minimum reporting level (MRL) if the analytical result is less than the contaminant's MRL. |
| 8. Analytical Result—Unit of Measure | The unit of measurement for the analytical results reported. [e.g., micrograms per liter, (μg/L); colony-forming units per 100 milliliters, (CFU/100 mL), etc.] |
| 9. Analytical Method Number | The identification number of the analytical method used. |
| 10. Sample Analysis Type | The type of sample collected. Permitted values include:<br>a. RFS—Raw field sample—untreated sample collected and submitted for analysis under this rule.<br>b. RDS—Raw duplicate field sample—untreated field sample duplicate collected at the same time and place as the raw field sample and submitted for analysis under this rule.<br>c. TFS—Treated field sample—treated sample collected and submitted for analysis under this rule.<br>d. TDS—Treated duplicate field sample—treated field sample duplicate collected at the same time and place as the treated field sample and submitted for analysis under this rule. |
| 11. Sample Batch Identification Number | The sample batch identification number consists of three parts:<br>a. Up to a 10-character laboratory identification code assigned by EPA.<br>b. Up to a 15-character code assigned by the laboratory to uniquely identify each extraction or analysis batch.<br>c. The date that the samples contained in each extraction batch extracted or in an analysis batch were analyzed, reported as an 8-digit number in the form 4-digit year, 2-digit month, and 2-digit day. |
| 12. Minimum Reporting Level | Minimum Reporting Level (MRL) refers to the lowest concentration of an analyte that may be reported. Unregulated contaminant monitoring (UCM) MRLs are established in § 141.40 monitoring requirements for unregulated contaminants. |
| 13. Minimum Reporting Level Unit of Measure. | The unit of measure to express the concentration, count, or other value of a contaminant level for the Minimum Reporting Level reported. (e.g., μg/L, colony forming units/100 mL (CFU/100 mL), etc.). |
| 14. Analytical Precision | Precision is the degree of agreement between two repeated measurements and is monitored through the use of duplicate spiked samples. For purposes of the Unregulated Contaminant Monitoring Regulation (UCMR), Analytical Precision is defined as the relative percent difference (RPD) between spiked matrix duplicates. The RPD for the spiked matrix duplicates analyzed in the same batch of samples as the analytical result being reported is to be entered in this field. Precision is calculated as Relative Percent Difference (RPD) of spiked matrix duplicates from the mean using:<br>RPD = absolute value of $[(X_1—X_2) /(X_1 +X_2)/2 ] \times 100\%$.<br>where:<br>$X_1$ is the concentration observed in spiked field sample minus the concentration observed in unspiked field sample.<br>$X_2$ is the concentration observed in duplicate spiked field sample minus the concentration observed in unspiked field sample. |
| 15. Analytical Accuracy | Accuracy describes how close a result is to the true value measured through the use of spiked field samples. For purposes of unregulated contaminant monitoring, accuracy is defined as the percent recovery of the contaminant in the spiked matrix sample analyzed in the same analytical batch as the sample result being reported and calculated using: |

TABLE 1—UNREGULATED CONTAMINANT MONITORING REPORTING REQUIREMENTS—Continued

| Data Element | Definition |
|---|---|
| | % recovery = [(amt. found in spiked sample—amt. found in sample)/amt. spiked] × 100%. |
| 16. Spiking Concentration | The concentration of method analyte(s) added to a sample to be analyzed for calculating analytical precision and accuracy where the value reported use the same unit of measure reported for Analytical Results. |
| 17. Presence/Absence | Reserved. |

(e) *How must I report this information?* (1) You must report results from monitoring under this rule using EPA's electronic reporting system. For quality control purposes, you must instruct the organization(s) responsible for the analysis of unregulated contaminant samples taken under §141.40 to *enter* the results into the reporting system, in the format specified by EPA. You are responsible for *reviewing* those results and *approving* the reporting (via the electronic system) of the results to EPA. You must also provide a copy of the results to the State, as directed by the State.

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

(f) *Does the laboratory to which I send samples report the results for me?* While you must instruct the organization conducting unregulated contaminant analysis (e.g., a laboratory) to enter the results into EPA's electronic reporting system, you are responsible for reviewing and approving the submission of the results to EPA. If the analytical organization or laboratory cannot enter these data for you using EPA's electronic reporting system, then you may explain to EPA in writing the reasons why alternate reporting is necessary and must receive EPA's approval to use an alternate reporting procedure.

(g) *Can I report previously collected data to meet the testing and reporting requirements for the contaminants listed in §141.40(a)(3)?* Yes, as long as the data meet the specific requirements of §141.40(a)(3), (4), (5), and Appendix A of §141.40 and you report the data with the information specified in paragraph (d) of this section.

[64 FR 50611, Sept. 17, 1999, as amended at 66 FR 2300, Jan. 11, 2001; 66 FR 27215, May 16, 2001; 67 FR 11046, Mar. 12, 2002]

## Subpart E—Special Regulations, Including Monitoring Regulations and Prohibition on Lead Use

### §141.40 Monitoring requirements for unregulated contaminants.

(a) *Requirements for owners and operators of public water systems*—(1) *Do I have to monitor for unregulated contaminants?*—(i) *Transient systems.* If you own or operate a transient non-community water system, you do not have to monitor for unregulated contaminants.

(ii) *Large systems not purchasing their entire water supply from another system.* If you own or operate a wholesale or retail public water system (other than a transient system) that serves more than 10,000 persons, as determined by the State, and do not purchase your entire water supply from another public water system, you must monitor as follows:

(A) You must monitor for the unregulated contaminants on List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section.

(B) You must monitor for the unregulated contaminants on List 2 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, if notified by your State or EPA that you are part of the Screening Surveys.

(C) You must monitor for the unregulated contaminants on List 3 of Table

1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, if notified by your State or EPA that you are part of the Pre-Screen Testing.

(iii) *Large systems purchasing their entire water supply from another system.* If you own or operate a public water system (other than a transient system) that serves more than 10,000 persons and purchase your entire water supply from a wholesale or retail public water system, you must monitor as follows:

(A) You must monitor for the unregulated contaminants on List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, that have a ''sampling location'' indicated as ''distribution system''.

(B) You must monitor for the unregulated contaminants on List 2 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, that have a ''sampling location'' indicated as ''distribution system'' if notified by your State or EPA that you are part of the Screening Surveys.

(C) You must monitor for the unregulated contaminants on List 3 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, that have a ''sampling location'' indicated as ''distribution system'' if notified by your State or EPA that you are part of the Pre-Screen Testing.

(iv) *Small systems not purchasing their entire water supply from another system.* If you own or operate a public water system (other than a transient system) that serves 10,000 or fewer persons and do not purchase your entire water supply from another public water system, you must monitor as follows:

(A) You must monitor for the unregulated contaminants on List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, 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 small systems.

(B) You must monitor for the unregulated contaminants on List 2 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, if you are notified by your State or EPA that you are part of the Screening Surveys.

(C) You must monitor for the unregulated contaminants on List 3 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, if you are notified by your State or EPA that you are part of the Pre-Screen Testing.

(v) *Small systems purchasing their entire water supply from another system.* If you own or operate a public water system (other than a transient system) that serves 10,000 or fewer persons and purchase your entire water supply from another public water system, you must monitor as follows:

(A) You must monitor for the unregulated contaminants on List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, that have a ''sampling location'' indicated as ''distribution system'' if you are notified by your State or EPA that you are part of the State Monitoring Plan for small systems.

(B) You must monitor for the unregulated contaminants on List 2 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, that have a ''sampling location'' indicated as ''distribution system'' if you are notified by your State or EPA that you are part of the Screening Surveys.

(C) You must monitor for the unregulated contaminants on List 3 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, that have a ''sampling location'' indicated as ''distribution system'' if you are notified by your State or EPA that you are part of the Pre-Screen Testing.

(2) *How would I be selected for the monitoring under the State Monitoring Plan, the Screening Surveys, or the Pre-Screen Testing?* (i) State Monitoring Plan. Only a representative sample of small systems must monitor for unregulated contaminants. EPA will select a national representative sample of small public water systems in each State through the use of a random number generator. Selection will be weighted by population served within each system water source type (surface or ground water) and system size category

(systems serving 25–500, 501–3,300, and 3,301–10,000 persons). EPA may allocate additional systems to water source types or system size categories to increase the statistical inferential ability for those categories. EPA will also select a small group of systems to be ''Index systems.'' Systems selected as Index systems are required to provide information about their site and operation that will serve to allow extrapolation of their results to other systems of similar size, rather than collecting detailed information at every small system. Each State will have the opportunity to make some modifications to the list of small systems that EPA selects. You will be notified by the State or EPA if your system is part of the final State Monitoring Plan.

(ii) *Screening Surveys*. The purpose of the Screening Surveys is to determine the occurrence of contaminants in drinking water or sources of drinking water for which analytical methods have recently been developed for unregulated contaminant monitoring. EPA will select up to 300 systems to participate in each survey by using a random number generator. You will be notified by the State or EPA if your system is selected for monitoring under the Screening Surveys.

(iii) *Pre-screen Testing*. The purpose of Pre-Screen Testing is to determine the occurrence of contaminants for which EPA needs to evaluate new analytical methods in locations where the contaminants are most likely to be found. EPA will select up to 200 systems to participate in this testing after considering the characteristics of the contaminants, precipitation, system operation, and environmental conditions. You will be notified by the State or EPA that your system has been selected for monitoring under the Pre-Screen Testing program.

(3) *For which contaminants must I monitor?* Lists 1, 2 and 3 of unregulated contaminants are listed in the following table:

TABLE 1—UNREGULATED CONTAMINANT MONITORING REGULATION (1999) LIST

| List 1—Assessment Monitoring Chemical Contaminants | | | | | |
|---|---|---|---|---|---|
| 1-Contaminant | 2–CAS registry number | 3-Analytical methods | 4-Minimum reporting level | 5-Sampling location | 6-Period during which monitoring to be completed |
| 2, 4-dinitrotoluene | 121–14–2 | EPA Method 525.2[a] | 2 µg/L[e] | EPTDS[f] | 2001–2003 |
| 2, 6 dinitrotoluene | 606–20–2 | EPA Method 525.2[a] | 2 µg/L[e] | EPTDS[f] | 2001–2003 |
| Acetochlor | 34256–82–1 | EPA Method 525.2[a] | 2 µg/L[o] | EPTDS[f] | 2001–2003 |
| DCPA mono-acid degradate[h] | 887–54–7 | EPA Method 515.1[a], EPA Method 515.2[a], EPA Method 515.3[i,j], EPA Method 515.4[k], D5317–93,[b] AOAC 992.32[c] | 1 µg/L[e] | EPTDS[f] | 2001–2003 |
| DCPA di-acid degradate[h] | 2136–79–0 | EPA Method 515.1[a], EPA Method 515.2[a], EPA Method 515.3,[i,j] EPA Method 515.4,[k] D5317–93,[b] AOAC 992.32[c] | 1 µg/L[e] | EPTDS[f] | 2001–2003 |
| 4,4′-DDE | 72–55–9 | EPA Method 508[a], EPA Method 508.1[a], EPA Method 525.2[a], D5812–96[b], AOAC 990.06[c] | 0.8 µg/L[e] | EPTDS[f] | 2001–2003 |

TABLE 1—UNREGULATED CONTAMINANT MONITORING REGULATION (1999) LIST—Continued

| List 1—Assessment Monitoring Chemical Contaminants | | | | | |
|---|---|---|---|---|---|
| 1-Contaminant | 2–CAS registry number | 3-Analytical methods | 4-Minimum reporting level | 5-Sampling location | 6-Period during which monitoring to be completed |
| EPTC | 759–94–4 | EPA Method 507[a], EPA Method 525.2[a], D5475–93[b], AOAC 991.07[c] | 1 μg/L[e] | EPTDS[f] | 2001–2003 |
| Molinate | 2212–67–1 | EPA Method 507[a], EPA Method 525.2[a], D5475–93[b], AOAC 991.07[c] | 0.9 μg/L[e] | EPTDS[f] | 2001–2003 |
| MTBE | 1634–04–4 | EPA Method 502.2[a,n], SM 6200C[d,n], EPA Method 524.2[a], D5790–95[b], SM 6210D[d], SM 6200B[d] | 5 μg/L[g] | EPTDS[f] | 2001–2003 |
| Nitrobenzene | 98–95–3 | EPA Method 524.2[a], D5790–95[b], SM6210D[d], SM6200B[d] | 10 μg/L[g] | EPTDS[f] | 2001–2003 |
| Perchlorate | 14797–73–0 | EPA Method 314.0[l] | 4 μg/L[m] | EPTDS[f] | 2001–2003 |
| Terbacil | 5902–51–2 | EPA Method 507[a], EPA Method 525.2[a], D5475–93[b], AOAC 991.07[c] | 2 μg/L[e] | EPTDS[f] | 2001–2003 |

Column headings are:

[1]—Chemical or microbiological contaminant: the name of the contaminants to be analyzed.

[2]—CAS (Chemical Abstract Service Number) Registry No. 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: the value and unit of measure at or above which the concentration or density of the contaminant must be measured using the Approved Analytical Methods.

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

[6]—Years During Which Monitoring to be Completed: The years during which the sampling and testing are to occur for the indicated contaminant.

The procedures shall be done in accordance with the documents listed next in these footnotes. The incorporation by reference of the following documents listed in footnotes b-d, i, k and l 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 following sources. 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, 401 M Street, SW., Washington, DC 20460 (Telephone: 202–260–3027); 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.*

[a] The version of the EPA methods which you must follow for this Rule are listed at § 141.24 (e).

[b] Annual Book of ASTM Standards, 1996, 1998 and 1999, Vol. 11.02, American Society for Testing and Materials. Method D5812–96, ''Standard Test Method for Determination of Organochlorine Pesticides in Water by Capillary Column Gas Chromatography'', is located in the Annual Book of ASTM Standards, 1998 and 1999, Vol. 11.02. Methods D5790–95, ''Standard Test Method for Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry''; D5475–93, ''Standard Test Method for Nitrogen- and Phosphorus-Containing Pesticides in Water by Gas Chromatography with a Nitrogen-Phosphorus Detector''; and D5317–93, ''Standard Test Method for Determination of Chlorinated Organic Acid Compounds in Water by Gas Chromatography with an Electron Capture Detector'' are located in the Annual Book of ASTM Standards, 1996 and 1998, Vol 11.02. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

[c] Official Methods of Analysis of AOAC (Association of Official Analytical Chemist) International, Sixteenth Edition, 4th Revision, 1998, Volume I, AOAC International, First Union National Bank Lockbox, PO Box 75198, Baltimore, MD 21275–5198. 800–379–2622.

[d] SM 6210 D is only found in the 18th and 19th editions of Standard Methods for the Examination of Water and Wastewater, 1992 and 1995, American Public Health Association; either edition may be used. SM 6200 B and 6200 C are only found in the 20th edition of Standard Methods for the Examination of Water and Wastewater, 1998. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005.

[e] Minimum Reporting Level determined by multiplying by 10 the least sensitive method's detection limit (detection limit =standard deviation times the Student's t value for 99% confidence level with n-1 degrees of freedom), or when available, multiplying by 5 the least sensitive method's estimated detection limit (where the estimated detection limit equals the concentration of compound yielding approximately a 5 to 1 signal to noise ratio or the calculated detection limit, whichever is greater).

[f] Entry Points to the Distribution System (EPTDS), after treatment, representing each non-emergency water source in use over the twelve-month period of monitoring: this only includes entry points for sources in operation during the months in which sampling is to occur. Sampling must occur at the EPTDS, unless the State has specified other sampling points that are used for compliance monitoring under 40 CFR 141.24 (f)(1), (2), and (3). See 40 CFR 141.40(a)(5)(ii)(C) for a complete explanation of requirements, including the use of source (raw) water sampling points.

[g] Minimum Reporting Levels (MRL) for Volatile Organic Compounds (VOC) determined by multiplying either the published detection limit or 0.5 μg/L times 10, whichever is greater. The detection limit of 0.5 μg/L (0.0005 mg/L) was selected to conform to VOC detection limit requirements of 40 CFR 141.24(f)(17)(E).

[h] The approved methods do not allow for the identification and quantitation of the individual acids. The single analytical result obtained should be reported as total DCPA mono- and di-acid degradates.

[i] EPA Method 515.3, ''Determination of Chlorinated Acids in Drinking Water by Liquid-Liquid Extraction, Derivatization and Gas Chromatography with Electron Capture Detection,'' Revision 1.0 July 1996. EPA 815-R–00–014, ''Methods for the Determination of Organic and Inorganic compounds in Drinking Water, Volume 1,'' August 2000. Available from the National Technical Information Service, NTIS PB2000–106981, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll free number is 800–553–6847. Alternatively, the method can be assessed and downloaded directly on-line at *www.epa.gov/safewater/methods/sourcalt.html.*

[j] Since EPA Method 515.3 does not include a solvent wash step following hydrolysis, the parent DCPA is not removed prior to analysis, therefore, only non-detect data may be reported using EPA Method 515.3. All samples with results above the MRL must be analyzed by one of the other approved methods.

[k] 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. Available by requesting a copy from the EPA Safe Drinking Water Hotline within the United States at 800–426–4791 (Hours are Monday through Friday, excluding federal holidays, from 9 a.m. to 5:30 p.m. Eastern Time). Alternatively, the method can be assessed and downloaded directly on-line at *www.epa.gov/safewater/methods/sourcalt.html.*

[l] EPA Method 314.0, ''Determination of Perchlorate in Drinking Water Using Ion Chromatography,'' Revision 1.0, EPA 815-B–99–003, November 1999. EPA 815-R–00–014, ''Methods for the Determination of Organic and Inorganic Compounds in Drinking Water, Volume 1,'' August 2000. Available from the National Technical Information Service, NTIS PB2000–106981, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll free number is 800–553–6847. Alternatively, the method can be assessed and downloaded directly on-line at *www.epa.gov/safewater/methods/sourcalt.html.*

[m] MRL was established at a concentration, which is at least ¼th the lowest known adverse health concentration, at which acceptable precision and accuracy has been demonstrated in spiked matrix samples.

[n] Sample preservation techniques and holding times specified in EPA Method 524.2 must be used by laboratories using either EPA Method 502.2 or Standard Methods 6200C.

List 2—Screening Survey Chemical Contaminants

| 1-Contaminant | 2-CAS registry number | 3-Analytical methods | 4-Minimum reporting level | 5-Sampling location | 6-Period during which monitoring to be completed |
|---|---|---|---|---|---|
| 1,2-diphenylhydrazine. | 122–66–7 | EPA Method 526[a] | 0.5 μg/L | EPTDS[e] | 2001—Selected Systems serving ≤10,000 persons; 2002—Selected systems serving > 10,000 persons. |
| 2-methyl-phenol | 95–48–7 | EPA Method 528[b] | 1 μg/L[f] | EPTDS[e] | Same as above. |
| 2,4-dichlorophenol | 120–83–2 | EPA Method 528[b] | 1 μg/L[f] | EPTDS[e] | Same as above. |
| 2,4-dinitrophenol | 51–28–5 | EPA Method 528[b] | 5 μg/L[f] | EPTDS[e] | Same as above. |
| 2,4,6-trichlorophenol. | 88–06–2 | EPA Method 528[b] | 1 μg/L[f] | EPTDS[e] | Same as above. |
| Alachlor ESA | Reserved[d] | Reserved[d] | Reserved[d] | Reserved[d] | Reserved[d] |
| Diazinon | 333–41–5 | EPA Method 526[a] | 0.5 μg/L[f] | EPTDS[e] | 2001—Selected Systems serving ≤10,000 persons; 2002—Selected systems serving > 10,000 persons. |
| Disulfoton | 298–04–4 | EPA Method 526[a] | 0.5 μg/L[f] | EPTDS[e] | Same as above. |
| Diuron | 330–54–1 | EPA Method 532[c] | 1 μg/L[f] | EPTDS[e] | Same as above. |
| Fonofos | 944–22–9 | EPA Method 526[a] | 0.5 μg/L[f] | EPTDS[e] | Same as above. |
| Linuron | 330–55–2 | EPA Method 532[c] | 1 μg/L[f] | EPTDS[e] | Same as above. |
| Nitrobenzene | 98–95–3 | EPA Method 526[a] | 0.5 μg/L[f] | EPTDS[e] | Same as above. |
| Prometon | 1610–18–0 | EPA Method 526[a] | 0.5 μg/L[f] | EPTDS[e] | Same as above. |
| RDX | 121–82–4 | Reserved[d] | Reserved[d] | Reserved[d] | Reserved.[d] |
| Terbufos | 13071–79-9 | EPA Method 526[a] | 0.5 μg/L[f] | EPTDS[e] | 2001—Selected Systems serving ≤10,000 persons; 2002-Selected systems serving > 10,000 persons. |

List 2—Screening Survey Microbiological Contaminants To Be Sampled

| 1-Contaminant | 2-Identification number | 3-Analytical methods | 4-Minimum reporting level | 5-Sampling location | 6-Period during which monitoring to be completed |
|---|---|---|---|---|---|
| *Aeromonas* | NA | EPA Method 1605 [h]. | 0.2—CFU/100mL [f] | Distribution System [g]. | 2003 |

Column headings are:

[1]—Chemical or microbiological contaminant: the name of the contaminants to be analyzed.

[2]—CAS (Chemical Abstract Service Number) Registry No. 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: the value and unit of measure at or above which the concentration or density of the contaminant must be measured using the Approved Analytical Methods.

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

[6]—Years During Which Monitoring to be Completed: the years during which the sampling and testing are to occur for the indicated contaminant.

The procedures shall be done in accordance with the documents listed next in these footnotes. The incorporation by reference of the following documents listed in footnotes a-c, 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 following sources. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800–426–4791. Copies of the documents may be obtained from the sources listed in these footnotes. 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, 401 M Street, SW., Washington, DC 20460 (Telephone: 202–260–3027); 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.*

[a] EPA Method 526, ''Determination of Selected Semivolatile Organic Compounds in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS),'' Revision 1.0, June 2000. EPA 815–R–00–014, ''Methods for the Determination of Organic and Inorganic Compounds in Drinking Water, Volume 1,'' August 2000. Available from the National Technical Information Service, NTIS PB2000–106981, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll free number is 800–553–6847. Alternatively, the method can be assessed and downloaded directly on-line at *www.epa.gov/safewater/methods/sourcalt.html.*

[b] EPA Method 528, ''Determination of Phenols in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS),'' Revision 1.0, April 2000. EPA 815–R–00–014, ''Methods for the Determination of Organic and Inorganic Compounds in Drinking Water, Volume 1,'' August 2000. Available from the National Technical Information Service, NTIS PB2000–106981, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll free number is 800–553–6847. Alternatively, the method can be assessed and downloaded directly on-line at *www.epa.gov/nerlcwww/ordmeth.htm.*

[c] EPA Method 532, ''Determination of Phenylurea Compounds in Drinking Water by Solid Phase Extraction and High Performance Liquid Chromatography with UV Detection,'' Revision 1.0, June 2000. EPA 815–R–00–014, ''Methods for the Determination of Organic and Inorganic Compounds in Drinking Water, Volume 1,'' August 2000. Available from the National Technical Information Service, NTIS PB2000–106981, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll free number is 800–553–6847. Alternatively, the method can be assessed and downloaded directly on-line at *www.epa.gov/safewater/methods/sourcalt.html.*

[d] To be specified at a later time.

[e] Entry Points to the Distribution System (EPTDS), after treatment, representing each non-emergency water source in use over the twelve-month period of monitoring: this only includes entry points for sources in operation during the months in which sampling is to occur. Sampling must occur at the EPTDS, source water sampling points are not permitted for List 2 contaminant monitoring.

[f] Minimum Reporting Level represents the value of the lowest concentration precision and accuracy determination made during methods development and documented in the method. If method options are permitted, the concentration used was for the least sensitive option.

[g] Three samples must be taken from the distribution system, which is owned or controlled by the selected PWS. The sample locations must include one sample from a point (MD from § 141.35(d)(3), Table 1) where the disinfectant residual is representative of the distribution system. This sample location may be selected from sample locations which have been previously identified for samples to be analyzed for coliform indicator bacteria. Coliform sample locations encompass a variety of sites including midpoint samples which may contain a disinfectant residual that is typical of the system. Coliform sample locations are described in 40 CFR 141.21. This same approach must be used for the *Aeromonas* midpoint sample where the disinfectant residual would not have declined and would be typical for the distribution system. Additionally, two samples must be taken from two different locations: the distal or dead-end location in the distribution system (MR from § 141.35(d)(3), Table 1), avoiding disinfectant booster stations, and from a location where previous determinations have indicated the lowest disinfectant residual in the distribution system (LD from § 141.35(d)(3), Table 1). If these two locations of distal and low disinfectant residual sites coincide, then the second sample must be taken at a location between the MD and MR sites. Locations in the distribution system where the disinfectant residual is expected to be low are similar to TTHM sampling points. Sampling locations for TTHMs are described in 63 FR 69468.

[h] EPA Method 1605 ''*Aeromonas* in Finished Water by Membrane Filtration using Ampicillin-Dextrin Agar with Vancomycin (ADA-V)'', October 2001, EPA # 821–R–01–034. The method can be accessed and downloaded directly on-line at *www.epa.gov/microbes.*

List 3—Pre-screen Testing Radionuclides To Be Sampled After Notice of Analytical Methods Availability

| 1-Contaminant | 2-CAS registry number | 3-Analytical methods | 4-Minimum reporting level | 5-Sampling location | 6-Period during which monitoring to be completed |
|---|---|---|---|---|---|
| Lead-210 | 14255–04–0 | Reserved [a] | Reserved [a] | Reserved [a] | Reserved. [a] |
| Polonium-210 | 13981–52–7 | Reserved [a] | Reserved [a] | Reserved [a] | Reserved. [a] |

List 3—Pre-screen Testing Microorganisms To Be Sampled After Notice of Analytical Methods Availability

| 1-Contaminant | 2-Identification number | 3-Analytical methods | 4-Minimum reporting level | 5-Sampling location | 6-Period during which monitoring to be completed |
|---|---|---|---|---|---|
| Cyanobacteria (blue-green algae, other freshwater algae and their toxins). | Reserved [a] | Reserved [a] | Reserved [a] | Reserved [a] | Reserved. [a] |
| Echoviruses | Reserved [a] | Reserved [a] | Reserved [a] | Reserved [a] | Reserved. [a] |
| Coxsackieviruses | Reserved [a] | Reserved [a] | Reserved [a] | Reserved [a] | Reserved. [a] |
| Helicobacter pylori | Reserved [a] | Reserved [a] | Reserved [a] | Reserved [a] | Reserved. [a] |
| Microsporidia | Reserved [a] | Reserved [a] | Reserved [a] | Reserved [a] | Reserved. [a] |
| Calciviruses | Reserved [a] | Reserved [a] | Reserved [a] | Reserved [a] | Reserved. [a] |
| Adenoviruses | Reserved [a] | Reserved [a] | Reserved [a] | Reserved [a] | Reserved. [a] |

Column headings are:
1–Chemical or microbiological contaminant: the name of the contaminants to be analyzed.
2–CAS (Chemical Abstract Service Number) Registry No. 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: the value and unit of measure at or above which the concentration or density of the contaminant must be measured using the Approved Analytical Methods.
5–Sampling Location: the locations within a PWS at which samples must be collected.
6–Years During Which Monitoring to be Completed: the years during which the sampling and testing are to occur for the indicated contaminant.
[a] To be determined at a later time.

(4) *What general requirements must I follow for monitoring List 1 contaminants?* (i) *All systems.* You must:

(A) Collect samples of the listed contaminants in accordance with paragraph (a)(5) of this section and Appendix A of this section and any other specific instructions provided to you by the State or EPA,

(B) Analyze the additional parameters specified below in Table 2. ''Water Quality Parameters to be Monitored with UCMR Contaminants'' for each relevant contaminant type. You must analyze the parameters for each sampling event of each sampling point, using the method indicated, and report using the data elements 1 through 10 in Table 1, §141.35(d), Unregulated Contaminant Monitoring Reporting Requirements;

(C) Review the laboratory testing results to ensure reliability; and

(D) Report the results as specified in §141.35.

TABLE 2—WATER QUALITY PARAMETERS TO BE MONITORED WITH UCMR CONTAMINANTS

| Parameter | Contaminant type | Analytical methods | | |
|---|---|---|---|---|
| | | EPA method | Standard methods [1] | Other |
| pH | Microbiological | EPA Method 150.1, [2] EPA Method 150.2 [2]. | 4500–$H^+$ B | ASTM D1293–84, [3] ASTM D1293–95. [3] |
| Turbidity | Microbiological | EPA Method 180.1 [4,5] | 2130 B [4] | GLI Method 2 [4,6]. |
| Temperature | Microbiological | | 2550. | |
| Free Disinfectant Residual. | Microbiological | | 4500–Cl D, 4500–Cl F, 4500–Cl G, 4500–Cl H, 4500–$ClO_2$ D, 4500–$ClO_2$ E, 4500–$O_3$ B. | ASTM 1253–86 [3] |
| Total Disinfectant Residual. | Microbiological | | 4500–Cl D, 4500–Cl E, [4] 4500–Cl F, 4500–Cl G, [4] 4500–Cl I. | ASTM D 1253–86 [3] |

The procedures shall be done in accordance with the documents listed in these footnotes. The incorporation by reference of the following documents 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 in these footnotes. 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, 401 M Street, SW., Washington, DC 20460 (Telephone: 202–260–3027); 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.*

[1] The 18th and 19th Editions of *Standard Methods for the Examination of Water and Wastewater,* 1992 and 1995. Methods 2130 B; 2550; 4500–Cl D, E, F, G, H, I; 4500–$ClO_2$ D, E; 4500–$H^+$ B; and 4500–$O_3$ B in the 20th edition *Standard Methods for the Examination of Water and Wastewater,* 1998, American Public Health Association, 1015 Fifteenth St. NW, Washington D.C., 20005.

[2] EPA Methods 150.1 and 150.2 are available from US EPA, NERL, 26 W. Martin Luther King Dr., Cincinnati, Ohio 45268. The identical methods are also in ''Methods for Chemical Analysis of Water and Wastes,'' EPA–600/4–79–020, March 1983, available from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Rd., Springfield, Virginia 22161, PB84–128677. (Note: NTIS toll-free number is 800–553–6847.)

[3] *Annual Book of ASTM Standards,* Editions 1994, 1996, 1998 and 1999, Volumes 11.01, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428. Version D1293–84, ''Standard Test Methods for pH of Water'' is located in the *Annual Book of ASTM Standards,* 1994, Volumes 11.01. Version D1293–95, ''Standard Test Methods for pH of Water'' is located in the Annual Book of ASTM Standards, 1996, 1998 and 1999, Volumes 11.01.

[4] ''Technical Notes on Drinking Water,'' EPA–600/R–94–173, October 1994, Available at NTIS, PB95–104766.

[5] ''Methods for the Determination of Inorganic Substances in Environmental Samples,'' EPA–600/R–93–100, August 1993. Available at NTIS, PB94–121811

[6] GLI Method 2, ''Turbidity,'' November 2, 1992, Great Lakes Instruments Inc., 8855 North 55th St., Milwaukee, Wisconsin 53223.

(ii) *Large systems*. In addition to paragraph (a)(4)(i) of this section, you must arrange for testing of the samples according to the methods specified for each contaminant in Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, and in Appendix A of this section.

(iii) *Small systems*. Unless directed otherwise by the State or EPA, in addition to paragraph (a)(4)(i) of this section , you must:

(A) Properly receive, store, maintain and use the sampling equipment sent to you from the laboratory designated by EPA;

(B) Sample at the times specified by the State or the EPA;

(C) Collect and pack samples in accordance with the instructions sent to you by the laboratory designated by EPA; and

(D) Send the samples to the laboratory designated by EPA.

(5) What specific sampling and quality control requirements must I follow for monitoring of List 1 contaminants?

(i) *All systems*. Unless the State or EPA informs you of other sampling arrangements, you must comply with the following requirements:

(A) *Sample collection and shipping time*. If you must ship the samples for testing, you must collect the samples early enough in the day to allow adequate time to send the samples for overnight delivery to the laboratory since some samples must be processed at the laboratory within 30 hours of collection. You must not collect samples on Friday, Saturday or Sunday because sampling on these days would not allow samples to be shipped and received at the laboratory within 30 hours.

(B) *No compositing of samples*. You must not composite (that is, combine, mix or blend) the samples. You must collect, preserve and test each sample separately.

(C) *Review and reporting of results*. After you have received the laboratory results, you must review and confirm the system information and data regarding sample collection and test results. You must report the results as provided in § 141.35.

(ii) *Large systems*. In addition to paragraph (a)(5)(i) of this section, you must comply with the following:

(A) *Timeframe*. You must collect the samples in one twelve-month period during the years indicated in column 6 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List.

(B) *Frequency*. You must collect the samples within the timeframe and according to the following frequency specified by contaminant type and water source type:

TABLE 3—MONITORING FREQUENCY BY CONTAMINANT AND WATER SOURCE TYPES

| Contaminant type | Water source type | Timeframe | Frequency |
|---|---|---|---|
| Chemical | Surface water | Twelve (12) months | Four quarterly samples taken as follows: Select either the first, second, or third month of a quarter and sample in that same month of each of four (4) consecutive quarters[a] to ensure that one of those sampling events occurs during the vulnerable time.[b] |
| | Ground water | Twelve (12) months | Two (2) times in a year taken as follows: Sample during one (1) month of the vulnerable time[b] and during one (1) month five (5) to seven (7) months earlier or later.[c] |

TABLE 3—MONITORING FREQUENCY BY CONTAMINANT AND WATER SOURCE TYPES—Continued

| Contaminant type | Water source type | Timeframe | Frequency |
|---|---|---|---|
| Microbiological ..... | Surface and ground water. | Twelve (12) months ..... | Six (6) times in a year taken as follows: Select either the first, second, or third month of a quarter and sample in that same month of each of four (4) consecutive quarters, and sample an additional 2 months during the warmest (vulnerable) quarter of the year.[d] |

[a] "Select either the first, second, or third month of a quarter and sample in that same month of each of four (4) consecutive quarters" means that you must monitor during each of the four (4) months of either: January, April, July, October; or February, May, August, November; or March, June, September, December.

[b] "Vulnerable time" means May 1 through July 31, unless the State or EPA informs you that it has selected a different time period for sampling as your system's vulnerable time.

[c] "Sample during one (1) month of the vulnerable time and during one (1) month five (5) to seven (7) months earlier or later" means, for example, that if you select May as your "vulnerable time" month to sample, then one (1) month five (5) to seven (7) months earlier would be either October, November or December of the preceding year, and one (1) month five (5) to seven (7) months later would be either, October, November, or December of the same year.

[d] This means that you must monitor during each of the six (6) months of either: January, April, July, August, September, October; or February, May, July, August, September, November; or March, June, July, August, September, December; unless the State or EPA informs you that a different vulnerable quarter has been selected for your system.

(C) *Location*. You must collect samples at the location specified for each listed contaminant in column 5 of the Table 1, UCMR (1999) List, in paragraph (a)(3) of this section. The sampling location for chemical contaminants must be the entry point to the distribution system or the compliance monitoring point specified by the State or EPA under 40 CFR 141.24 (f)(1), (2), and (3). Except as provided in this paragraph (a)(5)(ii)(C), if the compliance monitoring point as specified by the State is for source (raw) water and any of the contaminants in paragraph (a)(3) of this section are detected, then you must complete the source water monitoring for the indicated timeframe and also sample at the entry point to the distribution system representative of the affected source water only for the contaminant(s) found in the source water over the next twelve month timeframe, beginning in the next required monitoring period as indicated in paragraph (a)(5)(ii)(B), Table 3 of this section, even though monitoring might extend beyond the last year indicated in column 6, Period during which monitoring to be completed, in Table 1 of paragraph (a)(3). Exception: If the State or EPA determines that sampling at the entry point to the distribution system is unnecessary because no treatment was instituted between the source water and the distribution system that would affect measurement of the contaminants listed in paragraph (a)(3) of this section, then you do not have to sample at the entry point to the distribution system. Note: The sampling for List 2 chemical contaminants must be at the entry point to the distribution system, as specified in Table 1, List 2.

(D) *Sampling instructions*. You must follow the sampling procedure for the method specified in column 3 of List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, for each contaminant.

(E) *Testing and analytical methods*. For each listed contaminant, you must use the analytical method specified in column 3 of List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, the minimum reporting levels in column 4 of List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, and the quality control procedures specified in Appendix A of this section.

(F) *Sampling deviations*. If you do not collect a sample according to the procedures specified for a listed contaminant, you must resample within 14 days of observing the occurrence of the error (which may include notification from the laboratory that you must resample) following the procedures specified for the method. (This resampling is not for confirmation sampling but to correct the sampling error.)

(G) *Testing*. (*1*) Except as provided in paragraph (a)(5)(ii)(G)(*2*) and (*3*) of this section, you must arrange for the testing of the contaminants identified in List 1 of Table 1 by a laboratory certified under §141.28 for compliance

analysis using any of the analytical methods listed in column 3 for each contaminant in List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, whether you use the EPA analytical methods or non-EPA methods listed in List 1 of Table 1. Laboratories are automatically certified for the analysis of UCMR contaminants in List 1 of Table 1 if they are already certified to conduct compliance monitoring for a contaminant included in the same method being approved for UCMR analysis. Laboratories certified under § 141.28 for compliance analysis using EPA Method 515.3 are automatically approved to conduct UCMR analysis using EPA Method 515.4.

(*2*) You must arrange for the testing of Perchlorate as identified in List 1 of Table 1 by a laboratory certified under § 141.28 for compliance analysis using an approved ion chromatographic method as listed in § 141.28 and that has analyzed and successfully passed the Performance Testing (PT) Program administered by EPA.

(*3*) You must arrange for the testing of the chemical contaminants identified in List 2 of Table 1 by a laboratory certified under § 141.28 for compliance analysis using EPA Method 525.2 if performing UCMR analysis using EPA Methods 526 or 528, or a laboratory certified under § 141.28 for compliance analysis using EPA Methods 549.1 or 549.2 if performing UCMR analysis using EPA Method 532. You must arrange for the testing for *Aeromonas* using the approved method as identified in List 2 of Table 1 by a laboratory which is both certified under § 141.28 for compliance analysis for coliform indicator bacteria using an EPA approved membrane filtration procedure and which also has been granted approval for UCMR monitoring of *Aeromonas* by successfully passing the *Aeromonas* Performance Testing (PT) Program administered by EPA.

(iii) *Small systems that are part of the State Monitoring Plan.* Unless directed otherwise by the State or EPA, in addition to paragraph (a)(5)(i) of this section, you must comply with the following:

(A) *Timeframe and frequency.* You must collect samples at the times specified for you by the State or EPA, within the timeframe specified in paragraph (a)(5)(ii)(A) of this section and according to the frequency specified in paragraph (a)(5)(ii)(B) of this section for the contaminant type and water source type.

(B) *Location.* You must collect samples at the locations specified for you by the State or EPA.

(C) *Sampling deviations.* If you do not collect a sample according to the instructions provided to you for a listed contaminant, then you must report the deviation on the sample reporting form that you send to the laboratory with the samples. You must resample following instructions that you will be sent from EPA's designated laboratory or the State.

(D) *Sample kits.* You must store and maintain the sample collection kits sent to you by EPA's designated laboratory in a secure place until used for sampling. You should read the instructions for each kit when you receive it. If indicated in the kit's instructions, you must freeze the cold packs. 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 or arrive damaged, you must notify EPA's designated laboratory which sent you the sample collection kits.

(E) *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 preparing the sample and shipping containers for shipment. You must also comply with the instructions sent to you by EPA's designated laboratory concerning the handling of sample containers for specific contaminants.

(F) *Duplicate samples.* EPA will select systems in the State Monitoring Plan

that must collect duplicate samples for quality control. If your system is selected, you will receive two sample kits that you must use. You must use the same sampling protocols for both sets of samples, following the instructions in the duplicate sample kit.

(G) *Sampling forms.* You must completely fill out the sampling forms sent to you by the laboratory, including the data elements 1 through 4 listed in §141.35(d) for each sample. If EPA requests that you conduct field analysis of water quality parameters specified in paragraph (a)(4)(i)(B) of this section, you must also complete the sampling form to include the information for data elements 5 through 10 listed in §141.35(d) for each sample. You must sign and date the sampling forms.

(H) *Sample submission.* 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 in your instructions.

(6) *What additional requirements must I follow if my system is selected as an Index system?* If your system is selected as an Index system in the State Monitoring Plan, you must assist the State or EPA in identifying appropriate sampling locations and provide information on which wells and intakes are in use at the time of sampling, well casing and screen depths (if known) for those wells, and the pumping rate of each well or intake at the time of sampling.

(7) *What must I do if my system is selected for the Screening Surveys or Pre-Screen Testing?* (i) *All systems.* You must:

(A) Analyze the additional parameters specified in paragraph §141.40(a)(4)(i), Table 2, ''Water Quality Parameters to be Monitored with UCMR Contaminants'' for each relevant contaminant type. You must analyze the parameters for each sampling event of each sampling point, using the method indicated, and report the results using the data elements 1 through 10 in Table 1, §141.35(d), Unregulated Contaminant Monitoring Reporting requirements;

(B) Review the laboratory results to ensure reliability; and

(C) Report the results as specified in §141.35.

(ii) *Large systems.* If your system serves over 10,000 persons, you must collect and arrange for testing of the contaminants in List 2 and List 3 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, in accordance with the requirements set out in paragraphs (a)(4) and (5) of this section, with one exception: you must sample only at sampling locations specified in Table 1. You must send the samples to one of the laboratories approved under paragraph (G), this section. You are also responsible for reporting these results as required in §141.35.

(iii) *Small systems.* If your system serves 10,000 or fewer persons, you must collect samples in accordance with the instructions sent to you by the EPA or State, or, if informed by the EPA or State that the EPA or State will collect the sample, you must assist the State or EPA in identifying the appropriate sampling locations and in taking the samples. EPA will report the results to you and the State.

(8) *What is a violation of this Rule?* (i) Any failure to monitor in accordance with §141.40(a)(3) through (7) and Appendix A is a monitoring violation. (ii) Any failure to report in accordance with §141.35 is a reporting violation.

(b) *Requirements for State and Tribal Participation.* (1) How can I, as the director of a State or Tribal drinking water program, participate in unregulated contaminant monitoring, including Assessment Monitoring (which includes the State Monitoring Plan for small systems), the Screening Surveys, and Pre-Screen Testing of all systems? You can enter into a Memorandum of Agreement (MOA) with the EPA that describes your State's or Tribe's activities to:

(i) *Accept or modify the initial plan.* EPA will first specify the systems serving 10,000 or fewer persons by water source and size in an initial State Monitoring Plan for each State using a random number generator. EPA will also generate a replacement list of systems for systems that may not have been correctly specified on the initial plan. This initial State Monitoring Plan will also indicate the year and day, plus or minus two (2) weeks from the day, that

each system must monitor for the contaminants in List 1 of Table 1 of this section, Unregulated Contaminant Monitoring Regulation (1999) List. EPA will provide you with the initial monitoring plan for your State or Tribe, including systems to be Index systems and those systems to be part of the Screening Surveys. Within sixty (60) days of receiving your State's initial plan, you may notify EPA that you either accept it as your State Monitoring Plan or request to modify the initial plan by removing systems that have closed, merged or are purchasing water from another system and replacing them with other systems. Any purchased water system associated with a non-purchased water system must be added to the State Monitoring Plan if the State determines that its distribution system is the location of the maximum residence time or lowest disinfectant residual of the combined distribution system. In this case, the purchased water system must monitor for the contaminants for which the ''distribution system'' is identified as the point of ''maximum residence time'' or ''lowest disinfectant residual,'' depending on the contaminant, and not the community water system selling water to it. You must replace any systems you removed from the initial plan with systems from the replacement list in the order they are listed. Your request to modify the initial plan must include the modified plan and the reasons for the removal and replacement of systems. If you believe that there are reasons other than those previously listed for removing and replacing one or more other systems from the initial plan, you may include those systems and their replacement systems in your request to modify the initial plan. EPA will review your request to modify your State's initial plan. Please note that information about the actual or potential occurrence or non-occurrence of contaminants at a system or a system's vulnerability to contamination is not a basis for removal from or addition to the plan.

(ii) *Determine an alternate vulnerable time.* Within 60 days of receiving the initial State Monitoring Plan, you may also determine that the most vulnerable time of the year for any or all of the systems in the plan, and for any of the large systems that must monitor, is some period other than May 1 through July 31. If you make this determination, you must modify the initial plan to indicate the alternate vulnerable time and to which systems the alternate vulnerable time applies. EPA will review these determinations when you submit your request to modify your State's initial monitoring plan to the EPA. You must notify the small system(s) in your final State Monitoring Plan and the large system(s) of the most vulnerable time(s) of the year that you have specified for them to sample for one of their sampling events. You must notify them at least 90 days before their first unregulated contaminant sampling is to occur. You may need to consider the timing of monitoring in paragraph (b)(1)(iii) of this section.

(iii) *Modify the timing of monitoring.* Within sixty (60) days of receiving the initial plan, you may also modify the plan by selecting an alternative year and day, plus or minus two (2) weeks, within the years specified in column 6, List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, for monitoring for each system in the initial plan as long as approximately one-third of the systems in the State Plan monitor in each of the three (3) years listed. This monitoring may be coordinated with regulated contaminant compliance monitoring at your discretion. You must send the modified plan to EPA.

(iv) *Identify alternate sampling points for small systems in the State Monitoring Plan.* All systems are required to monitor for the contaminants at the sampling locations specified in column 5, List 1 of Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, unless the State specifies an alternate compliance sampling point as the sampling location. If the compliance sampling points for the small systems in the State Monitoring Plan are different than those specified in paragraph (a)(3) of this section, then you must indicate these sampling points in the plan. These alternative sampling points

must allow proper sampling and testing for the unregulated contaminants.

(v) *Notify small and large systems of their monitoring responsibilities.* You must provide notification to systems in the plan and, where appropriate, the large systems, at least ninety (90) days before sampling must occur.

(vi) *Provide instructions to systems that are part of the final State Monitoring Plan.* You must send a monitoring schedule to each system listed in the State Monitoring Plan and instructions on location, frequency, timing of sampling, use of sampling equipment, and handling and shipment of samples based on these regulations. EPA will provide you with guidance for these instructions. If you perform the sampling or make alternative arrangements for the sampling at the systems in the plan, you must inform EPA at least six (6) months before the first monitoring is to occur and address the alternative monitoring arrangements in the MOA.

(vii) *Participate in monitoring for the Screening Surveys for small and large systems.* Within 120 days prior to sampling, EPA will notify you which systems have been selected to participate in the Screening Surveys, the sampling dates, the designated laboratory for testing, and instructions for sampling. You must review the small systems that EPA selected for the State Monitoring Plan to ensure that the systems are not closed, merged or purchasing water from another system (unless the system is to conduct monitoring for a contaminant with the sampling location specified as ''distribution system''), and then make any replacements in the plan, as described in paragraph (b)(1)(i) of this section. You must notify the selected systems in your State of these Screening Surveys requirements. You must provide the necessary Screening Surveys information to the selected systems at least ninety (90) days prior to the sampling date.

(viii) *Participate in monitoring for Pre-Screen Testing for small and large systems.* You can participate in Pre-Screen Testing in two ways.

(A) First, within ninety (90) days of EPA's letter to you concerning initiation of Pre-Screen Testing for specific contaminants, you can identify from five (5) up to twenty-five (25) systems in your State that you determine to be representative of the most vulnerable systems to these contaminants, modify your State Monitoring Plan to include these most vulnerable systems if any serve 10,000 or fewer persons, and notify EPA of the addition of these systems to the State Plan. These systems must be selected from all community and non-transient noncommunity water systems. EPA will use the State-identified vulnerable systems to select up to 200 systems nationally to be monitored considering the characteristics of the contaminants, precipitation, system operation, and environmental conditions.

(B) Second, within 120 days prior to sampling, EPA will notify you which systems have been selected, sampling dates, the designated laboratory for testing of samples for systems serving 10,000 or fewer persons and approved laboratories for systems serving more than 10,000 persons, and instructions for sampling. You must notify the owners or operators of the selected systems in your State of these Pre-Screen Testing requirements. At least ninety (90) days prior to the sampling date, you must provide the necessary Pre-Screen Testing information to the owners or operators of the selected systems and then inform EPA that you took this action to allow sufficient time for EPA to ensure laboratory readiness.

(ix) *Revise system's treatment plant location(s) to include latitude and longitude.* For reporting to the Safe Drinking Water Information System, EPA already requires reporting of either the latitude and longitude or the street address for the treatment plant location. If the State enters into an MOA, the State must report each system's treatment plant location(s) as latitude and longitude (in addition to street address, if previously reported) by the time of the system's reporting of Assessment Monitoring results to the National Drinking Water Contaminant Occurrence Database. The State may use the latitude and longitude of facilities related to the public water system on the same site, or closely adjacent to the same site as the treatment plant, such as the latitude and longitude of the intake or wellhead/field or the

entry point to the distribution system, if such measurements are available.

(2) What if I decide not to participate in an MOA? If you decide not to enter into an MOA with EPA to develop the State Monitoring Plan for small systems, the initial monitoring plan that EPA sent you will become the final State Monitoring Plan for your State or Tribe. In that case, you may still notify each public water system of its selection for the plan and instructions for monitoring as long as you notify EPA that you will be undertaking this responsibility at least six (6) months prior to the first unregulated contaminant monitoring.

(3) Can I add contaminants to the Unregulated Contaminant Monitoring List? Yes, the SDWA allows Governors of seven (7) or more States to petition the EPA Administrator to add one or more contaminants to the Unregulated Contaminant Monitoring Regulation (1999) 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 in paragraph (a)(3) of this section, 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 Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section.

(4) Can I waive monitoring requirements? Only with EPA approval and under very limited conditions. Conditions and procedures for obtaining the only type of waiver available under these regulations are as follows:

(i) Application. You may apply to EPA for a State-wide waiver from the unregulated contaminant monitoring requirements for public water systems serving more than 10,000 persons. To apply for such a waiver, you must submit an application to EPA that includes the following information:

(A) the list of contaminants on the Unregulated Contaminant Monitoring List for which you request a waiver, and

(B) documentation for each contaminant in your request demonstrating that the contaminants have not been used, applied, stored, disposed of, released, naturally present or detected in the source waters or distribution systems in your State during the past 15 years, and that it does not occur naturally in your State.

(ii) Approval. EPA will notify you if EPA agrees to waive monitoring requirements.

APPENDIX A TO § 141.40—QUALITY CONTROL REQUIREMENTS FOR TESTING ALL SAMPLES COLLECTED

Your system must ensure that the quality control requirements listed below for testing of samples collected and submitted under § 141.40 are followed:

(1) Sample Collection/Preservation. Follow the sample collection and preservation requirements for the specified method for each of the contaminants in Table 1, UCMR (1999) List, 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 the laboratory must follow.

(2) Detection Limit. Calculate the laboratory detection limit for each contaminant in Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, of paragraph (a)(3) of this section using the appropriate procedure in the specified method with the exception that the contaminant concentration used to fortify reagent water must be less than or equal to the minimum reporting level (MRL) for the contaminants as specified in column 4, Table 1, UCMR (1999) List, in paragraph (a)(3) of this section. The calculated detection limit is equal to the standard deviation times the Student's t value for 99% confidence level with n-1 degrees of freedom. (The detection limit must be less than or equal to one-half of the MRL.)

(3) Calibration. Follow the initial calibration requirements as specified in the method utilized. Calibration must be verified initially with a low-level standard at a concentration at or below the MRL for each contaminant. Perform a continuing calibration verification following every 10th sample. The calibration verification must be performed by alternating low-level and mid-level calibration standards. The low-level standard is defined as a concentration at or below the MRL with an acceptance range of ±40%. The mid-level standard is in the middle of the

calibration range with an acceptance range of ±20%.

(4) Reagent Blank Analysis. Analyze one laboratory reagent (method) blank per sample set/batch that is treated exactly as a sample. The maximum allowable background concentration is one-half of the MRL for all contaminants. A field reagent blank is required only for EPA Method 524.2 (or equivalent listed methods, D5790.95, SM6210D, and SM6200B).

(5) Quality Control Sample. Obtain a quality control sample from an external source to check laboratory performance at least once each quarter.

(6) Matrix Spike and Duplicate. Prepare and analyze the sample matrix spike (SMS) for accuracy and matrix spike duplicate (MSD) samples for precision to determine method accuracy and precision for all contaminants in Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section. SMS/MSD samples must be prepared and analyzed at a frequency of 5% (or one SMS/MSD set per every 20 samples) or with each sample batch whichever is more frequent. In addition, the SMS/MSD spike concentrations must be alternated between a low-level spike and mid-level spike approximately 50% of the time. (For example: a set of 40 samples will require preparation and analysis of two SMS/MSD sets. The first set must be spiked at either the low-level or mid level, and the second set must be spiked with the other standard, either the low-level or mid-level, whichever was not used for the initial SMS/MSD set). The low-level SMS/MSD spike concentration must be within ±20% of the MRL for each contaminant. The mid-level SMS/MSD spike concentration must be within ±20% of the mid-level calibration standard for each contaminant, and should represent, where possible, an approximate average concentration observed in previous analyses of that analyte. The spiking concentrations must be reported in the same units of measure as the analytical results.

(7) Internal Standard Calibration. As appropriate to a method's requirements to be used, test and obtain an internal standard for the methods for each chemical contaminant in Table 1, Unregulated Contaminant Monitoring Regulation (1999) List, in paragraph (a)(3) of this section, a pure contaminant of known concentration, for calibration and quantitation purposes. The methods specify the percent recovery or response that you must obtain for acceptance.

(8) Method Performance Test. As appropriate to a method's requirements, test for surrogate compounds, a pure contaminant unlikely to be found in any sample, to be used to monitor method performance. The methods specify the percent recovery that you must obtain for acceptance.

(9) Detection Confirmation. Confirm any chemical contaminant analyzed using a gas chromatographic method and detected above the MRL, by gas chromatographic/mass spectrometric (GC/MS) methods. If testing resulted in first analyzing the sample extracts via specified gas chromatographic methods, an initial confirmation by a second column dissimilar to the primary column may be performed. If the contaminant detection is confirmed by the secondary column, then the contaminant must be reconfirmed by GC/MS using three (3) specified ion peaks for contaminant identification. Use one of the following confirming techniques: perform single point calibration of the GC/MS system for confirmation purposes only as long as the calibration standard is at a concentration within ±50% of the concentration determined by the initial analysis; or perform a three (3) point calibration with single point daily calibration verification of the GC/MS system regardless of whether that verification standard concentration is within ±50% of sample response. If GC/MS analysis confirms the initial contaminant detection, report results determined from the initial analysis.

(10) Reporting. Report the analytical results and other data, with the required data listed in 40 CFR 141.35, Table 1. Report this data electronically to EPA, unless EPA specifies otherwise, and provide a copy to the State. Systems must coordinate with their laboratories for electronic reporting to EPA to ensure proper formatting and timely data submission.

(11) Method Defined Quality Control. As appropriate to the method's requirements, perform analysis of Laboratory Fortified Blanks and Laboratory Performance Checks as specified in the method. Each method specifies acceptance criteria for these quality control checks.

[64 FR 50612, Sept. 17, 1999, as amended at 65 FR 11382, Mar. 2, 2000; 66 FR 2302, Jan. 11, 2001; 66 FR 27215, May 16, 2001; 66 FR 46225, Sept. 4, 2002; 67 FR 65900, Oct. 29, 2002]

### § 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]

### § 141.43 Prohibition on use of lead pipes, solder, and flux.

(a) *In general*—(1) *Prohibition*. Any pipe, solder, or flux, which is used after June 19, 1986, in the installation or repair of—

(i) Any public water system, or

(ii) Any plumbing in a residential or nonresidential facility providing water for human consumption which is connected to a public water system shall be lead free as defined by paragraph (d) of this section. This paragraph (a)(1) shall not apply to leaded joints necessary for the repair of cast iron pipes.

(2) [Reserved]

(b) *State enforcement*—(1) *Enforcement of prohibition*. The requirements of paragraph (a)(1) of this section shall be enforced in all States effective June 19, 1988. States shall enforce such requirements through State or local plumbing codes, or such other means of enforcement as the State may determine to be appropriate.

(2) [Reserved]

(c) *Penalties*. If the Administrator determines that a State is not enforcing the requirements of paragraph (a) of this section, as required pursuant to paragraph (b) of this section, the Administrator may withhold up to 5 percent of Federal funds available to that State for State program grants under section 1443(a) of the Act.

(d) *Definition of lead free.* For purposes of this section, the term lead free:

(1) When used with respect to solders and flux refers to solders and flux containing not more than 0.2 percent lead;

(2) When used with respect to pipes and pipe fittings refers to pipes and pipe fittings containing not more than 8.0 percent lead; and

(3) When used with respect to plumbing fittings and fixtures intended by the manufacturer to dispense water for human ingestion refers to fittings and fixtures that are in compliance with standards established in accordance with 42 U.S.C. 300g–6(e).

[52 FR 20674, June 2, 1987, as amended at 65 FR 2003, Jan. 12, 2000]

## 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)

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

| Contaminant | MCLG in mg/l |
|---|---|
| (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 |
| (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 |

[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]

### § 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 [1] |
| 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 |

[1] 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.

MCLGs for the following contaminants are as indicated:

| Contaminant | MCLG |
|---|---|
| (1) *Giardia lamblia* | zero |
| (2) Viruses | zero |
| (3) *Legionella* | zero |
| (4) Total coliforms (including fecal coliforms and *Escherichia coli*). | zero. |
| (5) *Cryptosporidium* | zero. |

[54 FR 27527, 27566, June 29, 1989; 55 FR 25064, June 19, 1990; 63 FR 69515, Dec. 16, 1998]

### § 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 $Cl_2$). |
| Chloramines | 4 (as $Cl_2$). |
| Chlorine dioxide | 0.8 (as $ClO_2$) |

[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.

(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; 66FR 7063, Jan. 22, 2001]

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

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

| CAS No. | Contaminant | MCL (mg/l) |
|---|---|---|
| (1) 75–01–4 | Vinyl chloride | 0.002 |
| (2) 71–43–2 | Benzene | 0.005 |

| CAS No. | Contaminant | MCL (mg/l) |
|---|---|---|
| (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 the Table below 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:

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 | Gylphosate | | | X |
| 76–44–8 | Heptachlor | X | | |
| 1024–57–3 | Heptachlor epoxide | X | | |
| 118–74–1 | Hexachlorobenzene | X | | |
| 77–47–3 | Hexachlorocyclopentadiene | X | X | |
| 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 | | |

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

| CAS No. | Contaminant | GAC | PTA | OX |
|---|---|---|---|---|
| 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 for synthetic organic contaminants apply to community water systems and non-transient, non-community water systems:

| CAS No. | Contaminant | MCL (mg/l) |
|---|---|---|
| (1) 15972–60–8 | Alachlor | 0.002 |
| (2) 116–06–3 | Aldicarb | 0.003 |
| (3) 1646–87–3 | Aldicarb sulfoxide | 0.004 |
| (4) 1646–87–4 | Aldicarb sulfone | 0.002 |
| (5) 1912–24–9 | Atrazine | 0.003 |
| (6) 1563–66–2 | Carbofuran | 0.04 |
| (7) 57–74–9 | Chlordane | 0.002 |
| (8) 96–12–8 | Dibromochloropropane | 0.0002 |
| (9) 94–75–7 | 2,4-D | 0.07 |
| (10) 106–93–4 | Ethylene dibromide | 0.00005 |
| (11) 76–44–8 | Heptachlor | 0.0004 |
| (12) 1024–57–3 | Heptachlor epoxide | 0.0002 |
| (13) 58–89–9 | Lindane | 0.0002 |
| (14) 72–43–5 | Methoxychlor | 0.04 |
| (15) 1336–36–3 | Polychlorinated biphenyls | 0.0005 |
| (16) 87–86–5 | Pentachlorophenol | 0.001 |
| (17) 8001–35–2 | Toxaphene | 0.003 |
| (18) 93–72–1 | 2,4,5-TP | 0.05 |
| (19) 50–32–8 | Benzo[a]pyrene | 0.0002 |
| (20) 75–99–0 | Dalapon | 0.2 |
| (21) 103–23–1 | Di(2-ethylhexyl) adipate | 0.4 |
| (22) 117–81–7 | Di(2-ethylhexyl) phthalate | 0.006 |
| (23) 88–85–7 | Dinoseb | 0.007 |
| (24) 85–00–7 | Diquat | 0.02 |
| (25) 145–73–3 | Endothall | 0.1 |
| (26) 72–20–8 | Endrin | 0.002 |
| (27) 1071–53–6 | Glyphosate | 0.7 |
| (28) 118–74–1 | Hexacholorbenzene | 0.001 |
| (29) 77–47–4 | Hexachlorocyclopentadiene | 0.05 |
| (30) 23135–22–0 | Oxamyl (Vydate) | 0.2 |
| (31) 1918–02–1 | Picloram | 0.5 |
| (32) 122–34–9 | Simazine | 0.004 |
| (33) 1746–01–6 | 2,3,7,8-TCDD (Dioxin) | $3\times10^{-8}$ |

[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]

**§ 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 [4] | 1, 2, 5, 6, 7, 9, 12 [5] |
| Asbestos | 2,3,8 |
| Barium | 5,6,7,9 |
| Beryllium | 1,2,5,6,7 |
| Cadmium | 2,5,6,7 |
| Chromium | 2,5,6 [2],7 |
| Cyanide | 5,7,13 |
| Mercury | 2 [1],4,6 [1],7 [1] |
| Nickel | 5,6,7 |
| Nitrate | 5,7,9 |
| Nitrite | 5,7 |
| Selenium | 1,2 [3],6,7,9 |
| Thallium | 1,5 |

[1] BAT only if influent Hg concentrations ≤10μg/1.
[2] BAT for Chromium III only.
[3] BAT for Selenium IV only.
[4] BATs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.
[5] 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) [1] FOR ARSENIC [2]

| Small system compliance technology | Affordable for listed small system categories [3] |
|---|---|
| Activated Alumina (centralized). | All size categories. |
| Activated Alumina (Point-of-Use) [4]. | All size categories. |
| Coagulation/Filtration [5] | 501–3,300, 3,301–10,000. |
| Coagulation-assisted Microfiltration. | 501–3,300, 3,301–10,000. |
| Electrodialysis reversal [6] | 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 [5] | 501–3,300, 3,301–10,000. |
| Oxidation/Filtration [7] | All size categories. |
| Reverse Osmosis (centralized) [6]. | 501–3,300, 3,301–10,000. |
| Reverse Osmosis (Point-of-Use) [4]. | All size categories. |

[1] Section 1412(b)(4)(E)(ii) of SDWA specifies that SSCTs must be affordable and technically feasible for small systems.
[2] SSCTs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.
[3] 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.
[4] 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.
[5] Unlikely to be installed solely for arsenic removal. May require pH adjustment to optimal range if high removals are needed.
[6] Technologies reject a large volume of water—may not be appropriate for areas where water quantity may be an issue.
[7] 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) The MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density.

(1) For a system which 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 which collects fewer than 40 samples/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) 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, this is a violation that may pose an acute risk to health.

(c) 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.

(d) 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:

(1) Protection of wells from contamination by coliforms 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, 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 subpart H, or disinfection of ground water 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.

[54 FR 27566, June 29, 1989; 55 FR 25064, June 19, 1990, as amended at 65 FR 26022, May 4, 2000]

### § 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 |
| 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 ≤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 ≥10,000: Improved distribution system and storage tank management to reduce residence time, plus the use of chloramines for disinfectant residual maintenance<br>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 $Cl_2$). |
| Chloramines | 4.0 (as $Cl_2$). |
| Chlorine dioxide | 0.8 (as $ClO_2$). |

(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*. 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, coagulation/filtration. |
| 3. Gross alpha particle activity (excluding Radon and Uranium) | 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 [1] | Raw water quality range and considerations. [1] |
|---|---|---|---|
| 1. Ion exchange (IE) | ([a]) | Intermediate | All ground waters. |
| 2. Point of use (POU [2]) IE | ([b]) | Basic | All ground waters. |
| 3. Reverse osmosis (RO) | ([c]) | Advanced | Surface waters usually require pre-filtration. |
| 4. POU [2] RO | ([b]) | Basic | Surface waters usually require pre-filtration. |
| 5. Lime softening | ([d]) | Advanced | All waters. |
| 6. Green sand filtration | ([e]) | Basic. | |
| 7. Co-precipitation with Barium sulfate | ([f]) | 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. | ([g]) | Intermediate | All ground waters. |
| 10. Activated alumina | ([a]), ([h]) | Advanced | All ground waters; competing anion concentrations may affect regeneration frequency. |
| 11. Enhanced coagulation/filtration | ([i]) | Advanced | Can treat a wide range of water qualities. |

[1] National Research Council (NRC). Safe Water from Every Tap: Improving Water Service to Small Communities. National Academy Press. Washington, D.C. 1997.

[2] 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:

[a] The regeneration solution contains high concentrations of the contaminant ions. Disposal options should be carefully considered before choosing this technology.

[b] 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.

[c] Reject water disposal options should be carefully considered before choosing this technology. See other RO limitations described in the SWTR Compliance Technologies Table.

[d] 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.

[e] Removal efficiencies can vary depending on water quality.

[f] 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.

[g] This technology is most applicable to small systems that already have filtration in place.

[h] Handling of chemicals required during regeneration and pH adjustment may be too difficult for small systems without an adequately trained operator.

[i] 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 [1] 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 photon activity | 1, 2, 3, 4 | 1, 2, 3, 4 | 1, 2, 3, 4. |
| 4. Uranium | 1, 2, 4, 10, 11 | 1, 2, 3, 4, 5, 10, 11 | 1, 2, 3, 4, 5, 10, 11. |

NOTE: [1] 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 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 §1412(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]

### §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 §1412 (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 §1412(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 beginnng 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 onsite disinfection challenge studies or other information satisfactory to the State, that $CT_{99.9}$ 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 *Esherichia 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*.

(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 and by using analytical test procedures contained in *Technical Notes on Drinking Water Methods*, EPA–600/R–94–173, October 1994, which is available at NTIS PB95–104766.

| Organism | Methodology | Citation [1] |
|---|---|---|
| Total Coliform [2] ..... | Total Coliform Fermentation Technique [3,4,5]. | 9221 A, B, C |
| | Total Coliform Membrane Filter Technique [6]. | 9222 A, B, C |
| | ONPG-MUG Test [7] | 9223 |
| Fecal Coliforms [2] ... | Fecal Coliform Procedure [8]. | 9221 E |
| | Fecal Coliform Filter Procedure. | 9222 D |
| Heterotrophic bacteria [2]. | Pour Plate Method | 9215 B |
| | SimPlate [11]. | |
| Turbidity ..... | Nephelometric Method. | 2130 B |
| | Nephelometric Method. | 180.1 [9] |
| | Great Lakes Instruments. | Method 2 [10] |
| | Hach FilterTrak .... | 10133 [12] |

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.*

[1] 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.

[2] The time from sample collection to initiation of analysis may not exceed 8 hours. Systems must hold samples below 10 deg. C during transit.

[3] 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.

[4] Media should cover inverted tubes at least one-half to two-thirds after the sample is added.

[5] No requirement exists to run the completed phase on 10 percent of all total coliform-positive confirmed tubes.

[6] 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.

[7] The ONPG-MUG Test is also known as the Autoanalysis Colilert System.

[8] A–1 Broth may be held up to three months in a tightly closed screw cap tube at 4 deg. C.

[9] ''Methods for the Determination of Inorganic Substances in Environmental Samples'', EPA/600/R–93/100, August 1993. Available at NTIS, PB94–121811.

[10] GLI Method 2, ''Turbidity'', November 2, 1992, Great Lakes Instruments, Inc., 8855 North 55th Street, Milwaukee, Wisconsin 53223.

[11] 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., One IDEXX Drive, Westbrook, Maine 04092, telephone (800) 321–0207.

[12] 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, Colorado 80539–0389. Phone: 800–227–4224.

(2) Public water systems must measure residual disinfectant concentrations with one of the analytical methods in the following table. Except for the method for ozone residuals, the disinfectant residual 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. The ozone method, 4500–$O_3$ B, is contained in both the 18th and 19th editions of Standard Methods for the Examination of Water and Wastewater, 1992, 1995; either edition may be used. If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine also may be measured by using DPD colorimetric test kits. 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 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 | Methods |
|---|---|---|
| Free Chlorine. | Amperometric Titration | 4500–Cl D |
| | DPD Ferrous Titrimetric. | 4500–Cl F |
| | DPD Colorimetric | 4500–Cl G |
| | Syringaldazine (FACTS). | 4500–Cl H |
| Total Chlorine. | Amperometric Titration | 4500–Cl D |
| | Amperometric Titration (low level measurement). | 4500–Cl E |
| | DPD Ferrous Titrimetric. | 4500–Cl F |
| | DPD Colorimetric | 4500–Cl G |
| | Iodometric Electrode | 4500–Cl I |
| Chlorine Dioxide. | Amperometric Titration | 4500–$ClO_2$ C |
| | DPD Method | 4500–$ClO_2$ D |
| | Amperometric Titration | 4500–$ClO_2$ E |
| Ozone | Indigo Method | 4500–$O_3$ B |

(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 [1] |
|---|---|
| ≤500 | 1 |
| 501 to 3,300 | 2 |
| 3,301 to 10,000 | 3 |
| 10,001 to 25,000 | 4 |
| >25,000 | 5 |

[1] 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 $CT_{99.9}$ 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 $CT_{99.9}$ 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 ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 0.5 °C OR LOWER [1]

| 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 |

TABLE 1.1—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 0.5 °C OR LOWER [1]—Continued

| Residual (mg/l) | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| | ≤6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | ≤9.0 |
| 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 |

[1] 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 $CT_{99.9}$ value at the lower temperature and at the higher pH.

TABLE 1.2—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 5.0 °C [1]

| 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 |

[1] 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 $CT_{99.9}$ value at the lower temperature, and at the higher pH.

TABLE 1.3—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 10.0 °C [1]

| 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 |

TABLE 1.3—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 10.0 °C [1]—Continued

| Free residual (mg/l) | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| | ≤6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | ≤9.0 |
| 2.8 .. | 93 | 111 | 134 | 163 | 197 | 239 | 287 |
| 3.0 .. | 95 | 113 | 137 | 166 | 201 | 243 | 292 |

[1] 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 $CT_{99.9}$ value at the lower temperature, and at the higher pH.

TABLE 1.4—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 15.0 °C [1]

| 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 |

[1] 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 $CT_{99.9}$ value at the lower temperature, and at the higher pH.

TABLE 1.5—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 20 °C [1]

| 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 |

TABLE 1.5—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 20 °C [1]—Continued

| Free residual (mg/l) | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| | ≤ 6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | ≤ 9.0 |
| 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 |

[1] 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 $CT_{99.9}$ value at the lower temperature, and at the higher pH.

TABLE 1.6—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 25 °C [1] 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 |

[1] 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 $CT_{99.9}$ value at the lower temperature, and at the higher pH.

TABLE 2.1—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORINE DIOXIDE AND OZONE [1]

| | 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 |

[1] 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 $CT_{99.9}$ value at the lower temperature for determining $CT_{99.9}$ values between indicated temperatures.

TABLE 3.1—CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORAMINES [1]

| Temperature | | | | | |
|---|---|---|---|---|---|
| < 1 °C | 5 °C | 10 °C | 15 °C | 20 °C | 25 °C |
| 3,800 | 2,200 | 1,850 | 1,500 | 1,100 | 750 |

[1] 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 $CT_{99.9}$ value at the lower temperature for determining $CT_{99.9}$ 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 ($CTcalc/CT_{99.9}$) is determined before or at the first customer during peak hourly flow and if the $CTcalc/CT_{99.9} \geq 1.0$, the 99.9 percent *Giardia lamblia* inactivation requirement has been achieved; or

(B) Successive $CTcalc/CT_{99.9}$ 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 $\frac{CTcalc}{CT_{99.9}}$ for each sequence.

(2) Add the $\frac{CTcalc}{CT_{99.9}}$ values together $\left(\sum \frac{(CTcalc)}{CT_{99.9}}\right)$

(3) If $\sum \left(\frac{CTcalc}{CT_{99.9}}\right) \geq 1.0$, the 99.9 percent *Giardia 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 $CTcalc/CT_{99.9}$ value of each sequence and

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

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:

$$\text{Percent inactivation} = 100 - \frac{100}{10^z}$$

$$\text{where } z = 3 \times \sum \left(\frac{CTcalc}{CT_{99.9}}\right)$$

(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 [1] |
|---|---|
| <500 | 1 |
| 501 to 1,000 | 2 |
| 1,001 to 2,500 | 3 |
| 2,501 to 3,300 | 4 |

[1] 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) 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, except that 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)(3) 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 [1] |
|---|---|
| ±500 | 1 |
| 501 to 1,000 | 2 |
| 1,001 to 2,500 | 3 |
| 2,501 to 3,300 | 4 |

[1] 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) 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, except that 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]

### § 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 CTcalc and CTcalc/$CT_{99.9}$ values for each disinfectant measurement or sequence and the sum of all CTcalc/$CT_{99.9}$ values ((CTcalc/$CT_{99.9}$)) before or at the first customer.

(vii) The daily determination of whether disinfection achieves adequate *Giardia* cyst and virus inactivation, *i.e.*, whether (CTcalc/$CT_{99.9}$) 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 Decemeber 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.

(a) *Applicability and effective dates.* (1) The requirements of this subpart I constitute the national primary drinking water regulations for lead and copper. Unless otherwise indicated, each of the provisions of this subpart applies to community water systems and non-transient, non-community water systems (hereinafter referred to as ''water systems'' or ''systems'').

(2) The requirements set forth in §§ 141.86 to 141.91 shall take effect on July 7, 1991. The requirements set forth in §§ 141.80 to 141.85 shall take effect on December 7, 1992.

(b) *Scope.* These regulations establish a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumers' taps.

(c) *Lead and copper action levels.* (1) The lead action level is exceeded if the concentration of lead in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with § 141.86 is greater than 0.015 mg/L (*i.e.*, if the ''90th percentile'' lead level is greater than 0.015 mg/L).

(2) The copper action level is exceeded if the concentration of copper in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with § 141.86 is greater than 1.3 mg/L (*i.e.*, if the ''90th percentile'' copper level is greater than 1.3 mg/L).

(3) The 90th percentile lead and copper levels shall be computed as follows:

(i) The results of all lead or copper samples taken during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

(ii) The number of samples taken during the monitoring period shall be multiplied by 0.9.

(iii) The contaminant concentration in the numbered sample yielded by the calculation in paragraph (c)(3)(ii) is the 90th percentile contaminant level.

(iv) For water systems serving fewer than 100 people that collect 5 samples per monitoring period, the 90th percentile is computed by taking the average of the highest and second highest concentrations.

(d) *Corrosion control treatment requirements.* (1) All water systems shall install and operate optimal corrosion control treatment as defined in § 141.2.

(2) Any water system that complies with the applicable corrosion control treatment requirements specified by the State under §§ 141.81 and 141.82 shall be deemed in compliance with the treatment requirement contained in paragraph (d)(1) of this section.

(e) *Source water treatment requirements.* Any system exceeding the lead or copper action level shall implement all applicable source water treatment requirements specified by the State under § 141.83.

(f) *Lead service line replacement requirements.* Any system exceeding the lead action level after implementation of applicable corrosion control and source water treatment requirements shall complete the lead service line replacement requirements contained in § 141.84.

(g) *Public education requirements.* Any system exceeding the lead action level shall implement the public education requirements contained in § 141.85.

(h) *Monitoring and analytical requirements.* Tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results under this subpart shall be completed in compliance with §§ 141.86, 141.87, 141.88, and 141.89.

(i) *Reporting requirements.* Systems shall report to the State any information required by the treatment provisions of this subpart and § 141.90.

(j) *Recordkeeping requirements.* Systems shall maintain records in accordance with § 141.91.

(k) *Violation of national primary drinking water regulations.* Failure to comply with the applicable requirements of §§ 141.80–141.91, including requirements established by the State pursuant to these provisions, shall constitute a violation of the national primary drinking water regulations for lead and/or copper.

[56 FR 26548, June 7, 1991; 57 FR 28788, June 29, 1992]

### § 141.81 Applicability of corrosion control treatment steps to small, medium-size and large water systems.

(a) Systems shall complete the applicable corrosion control treatment requirements described in § 141.82 by the deadlines established in this section.

(1) A large system (serving >50,000 persons) shall complete the corrosion control treatment steps specified in paragraph (d) of this section, unless it is deemed to have optimized corrosion control under paragraph (b)(2) or (b)(3) of this section.

(2) A small system (serving ≤3300 persons) and a medium-size system (serving >3,300 and ≤50,000 persons) shall complete the corrosion control treatment steps specified in paragraph (e) of this section, unless it is deemed to have optimized corrosion control under paragraph (b)(1), (b)(2), or (b)(3) of this section.

(b) A system is deemed to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in this section if the system satisfies one of the criteria specified in paragraphs (b)(1) through (b)(3) of this section. Any such system deemed to have optimized corrosion control under this paragraph, and which has treatment in place, shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the State determines appropriate to ensure optimal corrosion control treatment is maintained.

(1) A small or medium-size water system is deemed to have optimized corrosion control if the system meets the lead and copper action levels during each of two consecutive six-month monitoring periods conducted in accordance with § 141.86.

(2) Any water system may be deemed by the State to have optimized corrosion control treatment if the system demonstrates to the satisfaction of the State that it has conducted activities equivalent to the corrosion control steps applicable to such system under this section. If the State makes this determination, it shall provide the system with written notice explaining the basis for its decision and shall specify the water quality control parameters representing optimal corrosion control in accordance with § 141.82(f). Water systems deemed to have optimized corrosion control under this paragraph shall operate in compliance with the State-designated optimal water quality control parameters in accordance with § 141.82(g) and continue to conduct lead and copper tap and water quality parameter sampling in accordance with § 141.86(d)(3) and § 141.87(d), respectively. A system shall provide the State with the following information in order to

support a determination under this paragraph:

(i) The results of all test samples collected for each of the water quality parameters in § 141.82(c)(3).

(ii) A report explaining the test methods used by the water system to evaluate the corrosion control treatments listed in § 141.82(c)(1), the results of all tests conducted, and the basis for the system's selection of optimal corrosion control treatment;

(iii) A report explaining how corrosion control has been installed and how it is being maintained to insure minimal lead and copper concentrations at consumers' taps; and

(iv) The results of tap water samples collected in accordance with § 141.86 at least once every six months for one year after corrosion control has been installed.

(3) Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with § 141.86 and source water monitoring conducted in accordance with § 141.88 that demonstrates for two consecutive 6-month monitoring periods that the difference between the 90th percentile tap water lead level computed under § 141.80(c)(3), and the highest source water lead concentration is less than the Practical Quantitation Level for lead specified in § 141.89(a)(1)(ii).

(i) Those systems whose highest source water lead level is below the Method Detection Limit may also be deemed to have optimized corrosion control under this paragraph if the 90th percentile tap water lead level is less than or equal to the Practical Quantitation Level for lead for two consecutive 6-month monitoring periods.

(ii) Any water system deemed to have optimized corrosion control in accordance with this paragraph shall 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(c) and collecting the samples at times and locations specified in § 141.86(d)(4)(iv). Any such system that has not conducted a round of monitoring pursuant to § 141.86(d) since September 30, 1997, shall complete a round of monitoring pursuant to this paragraph no later than September 30, 2000.

(iii) Any water system deemed to have optimized corrosion control pursuant to this paragraph shall notify the State in writing pursuant to § 141.90(a)(3) of any change in treatment or the addition of a new source. The State may require any such system to conduct additional monitoring or to take other action the State deems appropriate to ensure that such systems maintain minimal levels of corrosion in the distribution system.

(iv) As of July 12, 2001, a system is not deemed to have optimized corrosion control under this paragraph, and shall implement corrosion control treatment pursuant to paragraph (b)(3)(v) of this section unless it meets the copper action level.

(v) Any system triggered into corrosion control because it is no longer deemed to have optimized corrosion control under this paragraph shall implement corrosion control treatment in accordance with the deadlines in paragraph (e) of this section. Any such large system shall adhere to the schedule specified in that paragraph for medium-size systems, with the time periods for completing each step being triggered by the date the system is no longer deemed to have optimized corrosion control under this paragraph.

(c) Any small or medium-size water system that is required to complete the corrosion control steps due to its exceedance of the lead or copper action level may cease completing the treatment steps whenever the system meets both action levels during each of two consecutive monitoring periods conducted pursuant to § 141.86 and submits the results to the State. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system (or the State, as the case may be) shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The State may require a system to repeat treatment steps previously completed by the system where the State determines that this is necessary to implement properly the treatment requirements of this section. The State shall

notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small- or medium-size system to implement corrosion control treatment steps in accordance with paragraph (e) of this section (including systems deemed to have optimized corrosion control under paragraph (b)(1) of this section) is triggered whenever any small- or medium-size system exceeds the lead or copper action level.

(d) *Treatment steps and deadlines for large systems.* Except as provided in paragraph (b) (2) and (3) of this section, large systems shall complete the following corrosion control treatment steps (described in the referenced portions of §§141.82, 141.86, and 141.87) by the indicated dates.

(1) *Step 1:* The system shall conduct initial monitoring (§141.86(d)(1) and §141.87(b)) during two consecutive six-month monitoring periods by January 1, 1993.

(2) *Step 2:* The system shall complete corrosion control studies (§141.82(c)) by July 1, 1994.

(3) *Step 3:* The State shall designate optimal corrosion control treatment (§141.82(d)) by January 1, 1995.

(4) *Step 4:* The system shall install optimal corrosion control treatment (§141.82(e)) by January 1, 1997.

(5) *Step 5:* The system shall complete follow-up sampling (§141.86(d)(2) and §141.87(c)) by January 1, 1998.

(6) *Step 6:* The State shall review installation of treatment and designate optimal water quality control parameters (§141.82(f)) by July 1, 1998.

(7) *Step 7:* The system shall operate in compliance with the State-specified optimal water quality control parameters (§141.82(g)) and continue to conduct tap sampling (§141.86(d)(3) and §141.87(d)).

(e) *Treatment Steps and deadlines for small and medium-size systems.* Except as provided in paragraph (b) of this section, small and medium-size systems shall 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.

(1) *Step 1:* The system shall conduct initial tap sampling (§141.86(d)(1) and §141.87(b)) until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under §141.86(d)(4). A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment (§141.82(a)) within six months after it exceeds one of the action levels.

(2) *Step 2:* Within 12 months after a system exceeds the lead or copper action level, the State may require the system to perform corrosion control studies (§141.82(b)). If the State does not require the system to perform such studies, the State shall specify optimal corrosion control treatment (§141.82(d)) within the following timeframes:

(i) For medium-size systems, within 18 months after such system exceeds the lead or copper action level,

(ii) For small systems, within 24 months after such system exceeds the lead or copper action level.

(3) *Step 3:* If the State requires a system to perform corrosion control studies under step 2, the system shall complete the studies (§141.82(c)) within 18 months after the State requires that such studies be conducted.

(4) *Step 4:* If the system has performed corrosion control studies under step 2, the State shall designate optimal corrosion control treatment (§141.82(d)) within 6 months after completion of step 3.

(5) *Step 5:* The system shall install optimal corrosion control treatment (§141.82(e)) within 24 months after the State designates such treatment.

(6) *Step 6:* The system shall complete follow-up sampling (§141.86(d)(2) and §141.87(c)) within 36 months after the State designates optimal corrosion control treatment.

(7) *Step 7:* The State shall review the system's installation of treatment and designate optimal water quality control parameters (§141.82(f)) within 6 months after completion of step 6.

(8) *Step 8:* The system shall operate in compliance with the State-designated optimal water quality control parameters (§141.82(g)) and continue to conduct tap sampling (§141.86(d)(3) and §141.87(d)).

[56 FR 26548, June 7, 1991, as amended at 59 FR 33862, June 30, 1994; 65 FR 2004, Jan. 12, 2000]

**§ 141.82 Description of corrosion control treatment requirements.**

Each system shall complete the corrosion control treatment requirements described below which are applicable to such system under § 141.81.

(a) *System recommendation regarding corrosion control treatment.* Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, small and medium-size water systems exceeding the lead or copper action level shall recommend installation of one or more of the corrosion control treatments listed in paragraph (c)(1) of this section which the system believes constitutes optimal corrosion control for that system. The State may require the system to conduct additional water quality parameter monitoring in accordance with § 141.87(b) to assist the State in reviewing the system's recommendation.

(b) *State decision to require studies of corrosion control treatment (applicable to small and medium-size systems).* The State may require any small or medium-size system that exceeds the lead or copper action level to perform corrosion control studies under paragraph (c) of this section to identify optimal corrosion control treatment for the system.

(c) *Performance of corrosion control studies.* (1) Any public water system performing corrosion control studies shall evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for that system:

(i) Alkalinity and pH adjustment;

(ii) Calcium hardness adjustment; and

(iii) The addition of a phosphate or silicate based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples.

(2) The water system shall evaluate each of the corrosion control treatments using either pipe rig/loop tests, metal coupon tests, partial-system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry and distribution system configuration.

(3) The water system shall measure the following water quality parameters in any tests conducted under this paragraph before and after evaluating the corrosion control treatments listed above:

(i) Lead;

(ii) Copper;

(iii) pH;

(iv) Alkalinity;

(v) Calcium;

(vi) Conductivity;

(vii) Orthophosphate (when an inhibitor containing a phosphate compound is used);

(viii) Silicate (when an inhibitor containing a silicate compound is used);

(ix) Water temperature.

(4) The water system shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document such constraints with at least one of the following:

(i) Data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics; and/or

(ii) Data and documentation demonstrating that the water system has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes.

(5) The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes.

(6) On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the State in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in paragraphs (c) (1) through (5) of this section.

(d) *State designation of optimal corrosion control treatment.* (1) Based upon consideration of available information including, where applicable, studies performed under paragraph (c) of this

section and a system's recommended treatment alternative, the State shall 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) of this section. When designating optimal treatment the State shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

(2) The State shall notify the system of its decision on optimal corrosion control treatment in writing and explain the basis for this determination. If the State requests additional information to aid its review, the water system shall provide the information.

(e) *Installation of optimal corrosion control.* Each system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated by the State under paragraph (d) of this section.

(f) *State review of treatment and specification of optimal water quality control parameters.* The State shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the water system and determine whether the system has properly installed and operated the optimal corrosion control treatment designated by the State in paragraph (d) of this section. Upon reviewing the results of tap water and water quality parameter monitoring by the system, both before and after the system installs optimal corrosion control treatment, the State shall designate:

(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 tap samples. Such value shall 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 the system to optimize corrosion control;

(3) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and 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;

(4) If alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples;

(5) If calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples.

The values for the applicable water quality control parameters listed above shall be those that the State determines to reflect optimal corrosion control treatment for the system. The State may designate values for additional water quality control parameters determined by the State to reflect optimal corrosion control for the system. The State shall notify the system in writing of these determinations and explain the basis for its decisions.

(g) *Continued operation and monitoring.* All systems optimizing corrosion control shall continue to operate and maintain optimal corrosion control treatment, including maintaining water quality parameters at or above minimum values or within ranges designated by the State under paragraph (f) of this section, in accordance with this paragraph for all samples collected under §141.87(d) through (f). Compliance with the requirements of this paragraph shall be determined every six months, as specified under §141.87(d). A water system is out of compliance with the requirements of this paragraph for a six-month period if it has excursions for any State-specified parameter on more than nine days 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 follows. States have discretion to delete results of obvious sampling errors from this calculation.

(1) On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the average of all results collected during the 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 of this chapter in the State's application for a program revision submitted pursuant to §142.12 of this chapter, the State's formula shall be used to aggregate multiple measurements taken at a sampling point for the water quality parameter in lieu of the formula in this paragraph.

(2) On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the result of that measurement.

(3) On days when no measurement is collected for the water quality parameter at the sampling location, the daily value shall be the daily value calculated on the most recent day on which the water quality parameter was measured at the sample site.

(h) *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 optimal corrosion control treatment under paragraph (d) of this section or optimal water quality control parameters under paragraph (f) 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 optimize corrosion control treatment. 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.

(i) *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 (d), (f), or (h) of this section and issue federal treatment determinations consistent with the requirements of those paragraphs where the Regional Administrator finds that:

(1) A State has failed to issue a treatment determination by the applicable deadlines contained in §141.81,

(2) A State has abused its discretion in a substantial number of cases or in cases affecting a substantial population, or

(3) The technical aspects of a State's determination would be indefensible in an expected Federal enforcement action taken against a system.

[56 FR 26548, June 7, 1991, as amended at 65 FR 2004, Jan. 12, 2000]

### §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)) within 6 months after exceeding the lead or copper action level.

(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(d)(2) and source water monitoring (§141.88(c)) within 36 months after completion of step 2.

(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 Lead service line replacement requirements.

(a) Systems that fail to meet the lead action level in tap samples taken pursuant to §141.86(d)(2), after installing corrosion control and/or source water treatment (whichever sampling occurs later), shall replace lead service lines in accordance with the requirements of this section. If a system is in violation of §141.81 or §141.83 for failure to install source water or corrosion control treatment, the State may require the system to commence lead service line replacement under this section after the date by which the system was required to conduct monitoring under §141.86(d)(2) has passed.

(b) A water system shall replace annually at least 7 percent of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The system shall identify the initial number of lead service lines in its distribution system, including an identification of the portion(s) owned by the system, based on a materials evaluation, including the evaluation required under §141.86(a) and relevant legal authorities (e.g., contracts, local ordinances) regarding the portion owned by the system. The first year of lead service line replacement shall begin on the date the action level was exceeded in tap sampling referenced in paragraph (a) of this section.

(c) A system is not required to replace an individual lead service line if the lead concentration in all service line samples from that line, taken pursuant to §141.86(b)(3), is less than or equal to 0.015 mg/L.

(d) A water system shall replace that portion of the lead service line that it owns. In cases where the system does not own the entire lead service line, the system shall notify the owner of the line, or the owner's authorized agent, that the system will replace the portion of the service line that it owns and shall offer to replace the owner's portion of the line. A system is not required to bear the cost of replacing the privately-owned portion of the line, nor is it required to replace the privately-owned portion where the owner chooses not to pay the cost of replacing the privately-owned portion of the line, or where replacing the privately-owned portion would be precluded by State, local or common law. A water system that does not replace the entire length of the service line also shall complete the following tasks.

(1) At least 45 days prior to commencing with the partial replacement of a lead service line, the water system shall provide notice to the resident(s) of all buildings served by the line explaining that they may experience a temporary increase of lead levels in their drinking water, along with guidance on measures consumers can take to minimize their exposure to lead. The State may allow the water system to provide notice under the previous sentence less than 45 days prior to commencing partial lead service line replacement where such replacement is in conjunction with emergency repairs. In addition, the water system shall inform the resident(s) served by the line that the system will, at the system's expense, collect a sample from each partially-replaced lead service line that is representative of the water in the service line for analysis of lead content, as prescribed under §141.86(b)(3), within 72 hours after the completion of the partial replacement of the service line. The system shall collect the sample and report the results of the analysis to the owner and the resident(s) served by the line within three business days of receiving the results. Mailed notices post-marked within three business days of receiving the results shall be considered ''on time.''

(2) The water system shall provide the information required by paragraph (d)(1) of this section to the residents of individual dwellings by mail or by other methods approved by the State. In instances where multi-family dwellings are served by the line, the water

system shall have the option to post the information at a conspicuous location.

(e) The State shall require a system to replace lead service lines on a shorter schedule than that required by this section, taking into account the number of lead service lines in the system, where such a shorter replacement schedule is feasible. The State shall make this determination in writing and notify the system of its finding within 6 months after the system is triggered into lead service line replacement based on monitoring referenced in paragraph (a) of this section.

(f) Any system may cease replacing lead service lines whenever first draw samples collected pursuant to §141.86(b)(2) meet the lead action level during each of two consecutive monitoring periods and the system submits the results to the State. If first draw tap samples collected in any such system thereafter exceeds the lead action level, the system shall recommence replacing lead service lines pursuant to paragraph (b) of this section.

(g) To demonstrate compliance with paragraphs (a) through (d) of this section, a system shall report to the State the information specified in §141.90(e).

[56 FR 26548, June 7, 1991; 57 FR 28788, June 29, 1992, as amended at 65 FR 2005, Jan. 12, 2000]

### §141.85 Public education and supplemental monitoring requirements.

A water system that exceeds the lead action level based on tap water samples collected in accordance with §141.86 shall deliver the public education materials contained in paragraphs (a) and (b) of this section in accordance with the requirements in paragraph (c) of this section.

(a) *Content of written public education materials*—(1) *Community water systems.* A community water system shall include the following text in all of the printed materials it distributes through its lead public education program. Systems may delete information pertaining to lead service lines, upon approval by the State, if no lead service lines exist anywhere in the water system service area. Public education language at paragraphs (a)(1)(iv)(B)(*5*) and (a)(1)(iv)(D)(*2*) of this section may be modified regarding building permit record availability and consumer access to these records, if approved by the State. Systems may also continue to utilize pre-printed materials that meet the public education language requirements in 40 CFR 141.85, effective November 6, 1991, and contained in the 40 CFR, parts 100 to 149, edition revised as of July 1, 1991. Any additional information presented by a system shall be consistent with the information below and be in plain English that can be understood by lay people.

(i) *Introduction.* The United States Environmental Protection Agency (EPA) and [insert name of water supplier] are concerned about lead in your drinking water. Although most homes have very low levels of lead in their drinking water, some homes in the community have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L). Under Federal law we are required to have a program in place to minimize lead in your drinking water by [insert date when corrosion control will be completed for your system]. This program includes corrosion control treatment, source water treatment, and public education. We are also required to replace the portion of each lead service line that we own if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program. If you have any questions about how we are carrying out the requirements of the lead regulation please give us a call at [insert water system's phone number]. This brochure explains the simple steps you can take to protect you and your family by reducing your exposure to lead in drinking water.

(ii) *Health effects of lead.* Lead is a common metal found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery porcelain and pewter, and water. Lead can pose a significant risk to your health if too much of it enters your body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults

can slow down normal mental and physical development of growing bodies. In addition, a child at play often comes into contact with sources of lead contamination—like dirt and dust—that rarely affect an adult. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths.

(iii) *Lead in drinking water.* (A) Lead in drinking water, although rarely the sole cause of lead poisoning, can significantly increase a person's total lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water. The EPA estimates that drinking water can make up 20 percent or more of a person's total exposure to lead.

(B) Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead-based solder used to join copper pipe, brass and chrome plated brass faucets, and in some cases, pipes made of lead that connect your house to the water main (service lines). In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%.

(C) When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon after returning from work or school, can contain fairly high levels of lead.

(iv) *Steps you can take in the home to reduce exposure to lead in drinking water.* (A) Despite our best efforts mentioned earlier to control water corrosivity and remove lead from the water supply, lead levels in some homes or buildings can be high. To find out whether you need to take action in your own home, have your drinking water tested to determine if it contains excessive concentrations of lead. Testing the water is essential because you cannot see, taste, or smell lead in drinking water. Some local laboratories that can provide this service are listed at the end of this booklet. For more information on having your water tested, please call [insert phone number of water system].

(B) If a water test indicates that the drinking water drawn from a tap in your home contains lead above 15 ppb, then you should take the following precautions:

(*1*) Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours. The longer water resides in your home's plumbing the more lead it may contain. Flushing the tap means running the cold water faucet until the water gets noticeably colder, usually about 15–30 seconds. If your house has a lead service line to the water main, you may have to flush the water for a longer time, perhaps one minute, before drinking. Although toilet flushing or showering flushes water through a portion of your home's plumbing system, you still need to flush the water in each faucet before using it for drinking or cooking. Flushing tap water is a simple and inexpensive measure you can take to protect your family's health. It usually uses less than one or two gallons of water and costs less than [insert a cost estimate based on flushing two times a day for 30 days] per month. To conserve water, fill a couple of bottles for drinking water after flushing the tap, and whenever possible use the first flush water to wash the dishes or water the plants. If you live in a high-rise building, letting the water flow before using it may not work to lessen your risk from lead. The plumbing systems have more, and sometimes larger pipes than smaller buildings. Ask your landlord for help in locating the source of the lead and for advice on reducing the lead level.

(*2*) Try not to cook with, or drink water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If you need hot water, draw water from the cold tap and heat it on the stove.

(*3*) Remove loose lead solder and debris from the plumbing materials installed in newly constructed homes, or

homes in which the plumbing has recently been replaced, by removing the faucet strainers from all taps and running the water from 3 to 5 minutes. Thereafter, periodically remove the strainers and flush out any debris that has accumulated over time.

(*4*) If your copper pipes are joined with lead solder that has been installed illegally since it was banned in 1986, notify the plumber who did the work and request that he or she replace the lead solder with lead-free solder. Lead solder looks dull gray, and when scratched with a key looks shiny. In addition, notify your State [insert name of department responsible for enforcing the Safe Drinking Water Act in your State] about the violation.

(*5*) Determine whether or not the service line that connects your home or apartment to the water main is made of lead. The best way to determine if your service line is made of lead is by either hiring a licensed plumber to inspect the line or by contacting the plumbing contractor who installed the line. You can identify the plumbing contractor by checking the city's record of building permits which should be maintained in the files of the [insert name of department that issues building permits]. A licensed plumber can at the same time check to see if your home's plumbing contains lead solder, lead pipes, or pipe fittings that contain lead. The public water system that delivers water to your home should also maintain records of the materials located in the distribution system. If the service line that connects your dwelling to the water main contributes more than 15 ppb to drinking water, after our comprehensive treatment program is in place, we are required to replace the portion of the line we own. If the line is only partially owned by the [insert the name of the city, county, or water system that owns the line], we are required to provide the owner of the privately-owned portion of the line with information on how to replace the privately-owned portion of the service line, and offer to replace that portion of the line at the owner's expense. If we replace only the portion of the line that we own, we also are required to notify you in advance and provide you with information on the steps you can take to minimize exposure to any temporary increase in lead levels that may result from the partial replacement, to take a follow-up sample at our expense from the line within 72 hours after the partial replacement, and to mail or otherwise provide you with the results of that sample within three business days of receiving the results. Acceptable replacement alternatives include copper, steel, iron, and plastic pipes.

(*6*) Have an electrician check your wiring. If grounding wires from the electrical system are attached to your pipes, corrosion may be greater. Check with a licensed electrician or your local electrical code to determine if your wiring can be grounded elsewhere. DO NOT attempt to change the wiring yourself because improper grounding can cause electrical shock and fire hazards.

(C) The steps described above will reduce the lead concentrations in your drinking water. However, if a water test indicates that the drinking water coming from your tap contains lead concentrations in excess of 15 ppb after flushing, or after we have completed our actions to minimize lead levels, then you may want to take the following additional measures:

(*1*) Purchase or lease a home treatment device. Home treatment devices are limited in that each unit treats only the water that flows from the faucet to which it is connected, and all of the devices require periodic maintenance and replacement. Devices such as reverse osmosis systems or distillers can effectively remove lead from your drinking water. Some activated carbon filters *may* reduce lead levels at the tap, however all lead reduction claims should be investigated. Be sure to check the actual performance of a specific home treatment device before and after installing the unit.

(*2*) Purchase bottled water for drinking and cooking.

(D) You can consult a variety of sources for additional information. Your family doctor or pediatrician can perform a blood test for lead and provide you with information about the health effects of lead. State and local government agencies that can be contacted include:

(*1*) [insert the name of city or county department of public utilities] at [insert phone number] can provide you with information about your community's water supply, and a list of local laboratories that have been certified by EPA for testing water quality;

(*2*) [insert the name of city or county department that issues building permits] at [insert phone number] can provide you with information about building permit records that should contain the names of plumbing contractors that plumbed your home; and

(*3*) [insert the name of the State Department of Public Health] at [insert phone number] or the [insert the name of the city or county health department] at [insert phone number] can provide you with information about the health effects of lead and how you can have your child's blood tested.

(E) The following is a list of some State approved laboratories in your area that you can call to have your water tested for lead. [Insert names and phone numbers of at least two laboratories].

(2) *Non-transient non-community water systems.* A non-transient non-community water system shall either include the text specified in paragraph (a)(1) of this section or shall include the following text in all of the printed materials it distributes through its lead public education program. Water systems may delete information pertaining to lead service lines upon approval by the State if no lead service lines exist anywhere in the water system service area. Any additional information presented by a system shall be consistent with the information below and be in plain English that can be understood by lay people.

(i) *Introduction.* The United States Environmental Protection Agency (EPA) and [insert name of water supplier] are concerned about lead in your drinking water. Some drinking water samples taken from this facility have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L). Under Federal law we are required to have a program in place to minimize lead in your drinking water by [insert date when corrosion control will be completed for your system]. This program includes corrosion control treatment, source water treatment, and public education. We are also required to replace the portion of each lead service line that we own if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program. If you have any questions about how we are carrying out the requirements of the lead regulation please give us a call at [insert water system's phone number]. This brochure explains the simple steps you can take to protect yourself by reducing your exposure to lead in drinking water.

(ii) *Health effects of lead.* Lead is found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery porcelain and pewter, and water. Lead can pose a significant risk to your health if too much of it enters your body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults can slow down normal mental and physical development of growing bodies. In addition, a child at play often comes into contact with sources of lead contamination—like dirt and dust—that rarely affect an adult. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths.

(iii) *Lead in drinking water.* (A) Lead in drinking water, although rarely the sole cause of lead poisoning, can significantly increase a person's total lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water. The EPA estimates that drinking water can make up 20 percent or more of a person's total exposure to lead.

(B) Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead-based solder used to join copper pipe, brass and chrome-plated brass faucets, and in

some cases, pipes made of lead that connect houses and buildings to water mains (service lines). In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%.

(C) When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon if the water has not been used all day, can contain fairly high levels of lead.

(iv) *Steps you can take to reduce exposure to lead in drinking water.* (A) Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours. The longer water resides in plumbing the more lead it may contain. Flushing the tap means running the cold water faucet for about 15–30 seconds. Although toilet flushing or showering flushes water through a portion of the plumbing system, you still need to flush the water in each faucet before using it for drinking or cooking. Flushing tap water is a simple and inexpensive measure you can take to protect your health. It usually uses less than one gallon of water.

(B) Do not cook with, or drink water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If you need hot water, draw water from the cold tap and then heat it.

(C) The steps described above will reduce the lead concentrations in your drinking water. However, if you are still concerned, you may wish to use bottled water for drinking and cooking.

(D) You can consult a variety of sources for additional information. Your family doctor or pediatrician can perform a blood test for lead and provide you with information about the health effects of lead. State and local government agencies that can be contacted include:

(*1*) [insert the name or title of facility official if appropriate] at [insert phone number] can provide you with information about your facility's water supply; and

(*2*) [insert the name or title of the State Department of Public Health] at [insert phone number] or the [insert the name of the city or county health department] at [insert phone number] can provide you with information about the health effects of lead.

(b) *Content of broadcast materials.* A water system shall include the following information in all public service announcements submitted under its lead public education program to television and radio stations for broadcasting:

(1) Why should everyone want to know the facts about lead and drinking water? Because unhealthy amounts of lead can enter drinking water through the plumbing in your home. That's why I urge you to do what I did. I had my water tested for [insert free or $ per sample]. You can contact the [insert the name of the city or water system] for information on testing and on simple ways to reduce your exposure to lead in drinking water.

(2) To have your water tested for lead, or to get more information about this public health concern, please call [insert the phone number of the city or water system].

(c) *Delivery of a public education program.* (1) In communities where a significant proportion of the population speaks a language other than English, public education materials shall be communicated in the appropriate language(s).

(2) A community water system that exceeds the lead action level on the basis of tap water samples collected in accordance with § 141.86, and that is not already repeating public education tasks pursuant to paragraph (c)(3), (c)(7), or (c)(8), of this section, shall, within 60 days:

(i) Insert notices in each customer's water utility bill containing the information in paragraph (a)(1) of this section, along with the following alert on the water bill itself in large print: ''SOME HOMES IN THIS COMMUNITY HAVE ELEVATED LEAD LEVELS IN THEIR DRINKING WATER. LEAD CAN POSE A SIGNIFICANT RISK TO YOUR HEALTH. PLEASE READ THE ENCLOSED NOTICE FOR FURTHER INFORMATION.'' A community water system having a billing cycle that does

not include a billing within 60 days of exceeding the action level, or that cannot insert information in the water utility bill without making major changes to its billing system, may use a separate mailing to deliver the information in paragraph (a)(1) of this section as long as the information is delivered to each customer within 60 days of exceeding the action level. Such water systems shall also include the ''alert'' language specified in this paragraph.

(ii) Submit the information in paragraph (a)(1) of this section to the editorial departments of the major daily and weekly newspapers circulated throughout the community.

(iii) Deliver pamphlets and/or brochures that contain the public education materials in paragraphs (a)(1)(ii) and (a)(1)(iv) of this section to facilities and organizations, including the following:

(A) Public schools, and/or local school boards;

(B) City or county health department;

(C) Women, Infants, and Children and/or Head Start Program(s) whenever available;

(D) Public and private hospitals and/or clinics;

(E) Pediatricians;

(F) Family planning clinics; and

(G) Local welfare agencies.

(iv) Submit the public service announcement in paragraph (b) of this section to at least five of the radio and television stations with the largest audiences that broadcast to the community served by the water system.

(3) A community water system shall repeat the tasks contained in paragraphs (c)(2) (i), (ii) and (iii) of this section every 12 months, and the tasks contained in paragraphs (c)(2)(iv) of this section every 6 months for as long as the system exceeds the lead action level.

(4) Within 60 days after it exceeds the lead action level (unless it already is repeating public education tasks pursuant to paragraph (c)(5) of this section), a non-transient non-community water system shall deliver the public education materials specified by paragraph (a)(1) of this section or the public education materials specified by paragraph (a)(2) 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; 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.

(5) A non-transient non-community water system shall repeat the tasks contained in paragraph (c)(4) of this section at least once during each calendar year in which the system exceeds the lead action level.

(6) A water system may discontinue delivery of public education materials if the system has met the lead action level during the most recent six-month monitoring period conducted pursuant to §141.86. Such a system shall recommence public education in accordance with this section if it subsequently exceeds the lead action level during any monitoring period.

(7) A community water system may apply to the State, in writing, (unless the State has waived the requirement for prior State approval) to use the text specified in paragraph (a)(2) of this section in lieu of the text in paragraph (a)(1) of this section and to perform the tasks listed in paragraphs (c)(4) and (c)(5) of this section in lieu of the tasks in paragraphs (c)(2) and (c)(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.

(8)(i) A community water system serving 3,300 or fewer people may omit the task contained in paragraph (c)(2)(iv) of this section. As long as it distributes notices containing the information contained in paragraph (a)(1) of this section to every household served by the system, such systems

may further limit their public education programs as follows:

(A) Systems serving 500 or fewer people may forego the task contained in paragraph (c)(2)(ii) of this section. Such a system may limit the distribution of the public education materials required under paragraph (c)(2)(iii) of this section to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children, unless it is notified by the State in writing that it must make a broader distribution.

(B) If approved by the State in writing, a system serving 501 to 3,300 people may omit the task in paragraph (c)(2)(ii) of this section and/or limit the distribution of the public education materials required under paragraph (c)(2)(iii) of this section to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children.

(ii) A community water system serving 3,300 or fewer people that delivers public education in accordance with paragraph (c)(8)(i) of this section shall repeat the required public education tasks at least once during each calendar year in which the system exceeds the lead action level.

(d) *Supplemental monitoring and notification of results.* A water system that fails to meet the lead action level on the basis of tap samples collected in accordance with §141.86 shall offer to sample the tap water of any customer who requests it. The system is not required to pay for collecting or analyzing the sample, nor is the system required to collect and analyze the sample itself.

[56 FR 26548, June 7, 1991; 57 FR 28788, June 29, 1992, as amended at 65 FR 2005, Jan. 12, 2000; 69 FR 38856, June 29, 2004]

### §141.86 Monitoring requirements for lead and copper in tap water.

(a) *Sample site location.* (1) By the applicable date for commencement of monitoring under paragraph (d)(1) of this section, each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of this section, and which is sufficiently large to ensure that the water system can collect the number of lead and copper tap samples required in paragraph (c) of this section. All sites from which first draw samples are collected shall be selected from this pool of targeted sampling sites. Sampling sites may not include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants.

(2) A water system shall use the information on lead, copper, and galvanized steel that it is required to collect under §141.42(d) of this part [special monitoring for corrosivity characteristics] when conducting a materials evaluation. When an evaluation of the information collected pursuant to §141.42(d) is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in paragraph (a) of this section, the water system shall review the sources of information listed below in order to identify a sufficient number of sampling sites. In addition, the system shall seek to collect such information where possible in the course of its normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities):

(i) All plumbing codes, permits, and records in the files of the building department(s) which indicate the plumbing materials that are installed within publicly and privately owned structures connected to the distribution system;

(ii) All inspections and records of the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system; and

(iii) All existing water quality information, which includes the results of all prior analyses of the system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations.

(3) The sampling sites selected for a community water system's sampling pool (''tier 1 sampling sites'') shall consist of single family structures that:

(i) Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

(ii) Are served by a lead service line. When multiple-family residences comprise at least 20 percent of the structures served by a water system, the system may include these types of structures in its sampling pool.

(4) Any community water system with insufficient tier 1 sampling sites shall complete its sampling pool with ''tier 2 sampling sites'', consisting of buildings, including multiple-family residences that:

(i) Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

(ii) Are served by a lead service line.

(5) Any community water system with insufficient tier 1 and tier 2 sampling sites shall complete its sampling pool with ''tier 3 sampling sites'', consisting of single family structures that contain copper pipes with lead solder installed before 1983. A community water system with insufficient tier 1, tier 2, and tier 3 sampling sites shall complete its sampling pool with representative sites throughout the distribution system. For the purpose of this paragraph, 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.

(6) The sampling sites selected for a non-transient noncommunity water system (''tier 1 sampling sites'') shall consist of buildings that:

(i) Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

(ii) Are served by a lead service line.

(7) A non-transient non-community water system with insufficient tier 1 sites that meet the targeting criteria in paragraph (a)(6) of this section shall complete its sampling pool with sampling sites that contain copper pipes with lead solder installed before 1983. If additional sites are needed to complete the sampling pool, the non-transient non-community water system shall use representative sites throughout the distribution system. For the purpose of this paragraph, 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.

(8) Any water system whose distribution system contains lead service lines shall draw 50 percent of the samples it collects during each monitoring period from sites that contain lead pipes, or copper pipes with lead solder, and 50 percent of the samples from sites served by a lead service line. A water system that cannot identify a sufficient number of sampling sites served by a lead service line shall collect first-draw samples from all of the sites identified as being served by such lines.

(b) *Sample collection methods.* (1) All tap samples for lead and copper collected in accordance with this subpart, with the exception of lead service line samples collected under §141.84(c) and samples collected under paragraph (b)(5) of this section, shall be first-draw samples.

(2) Each first-draw tap sample for lead and copper shall be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least six hours. First-draw samples from residential housing shall be collected from the cold water kitchen tap or bathroom sink tap. First-draw samples from a nonresidential building shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. Non-first-draw samples collected in lieu of first-draw samples pursuant to paragraph (b)(5) of this section shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. First-draw samples may be collected by the system or the system may allow residents to collect first-draw samples after instructing the residents of the sampling procedures specified in this paragraph. To avoid problems of residents handling nitric acid, acidification of first-draw samples may be done up to 14 days after the sample is collected. After acidification to resolubilize the metals, the sample must stand in the original container for the time specified in the approved EPA method before the sample can be analyzed. If a system allows residents to perform sampling, the system may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.

(3) Each service line sample shall be one liter in volume and have stood motionless in the lead service line for at least six hours. Lead service line samples shall be collected in one of the following three ways:

(i) At the tap after flushing the volume of water between the tap and the lead service line. The volume of water shall be calculated based on the interior diameter and length of the pipe between the tap and the lead service line;

(ii) Tapping directly into the lead service line; or

(iii) If the sampling site is a building constructed as a single-family residence, allowing the water to run until there is a significant change in temperature which would be indicative of water that has been standing in the lead service line.

(4) A water system shall collect each first draw tap sample from the same sampling site from which it collected a previous sample. If, for any reason, the water system cannot gain entry to a sampling site in order to collect a follow-up tap sample, the system may collect the follow-up tap sample from another sampling site in its sampling pool as long as the new site meets the same targeting criteria, and is within reasonable proximity of the original site.

(5) A non-transient non-community water system, or a community water system that meets the criteria of §§141.85(c)(7)(i) and (ii), that does not have enough taps that can supply first-draw samples, as defined in §141.2, may apply to the State in writing to substitute non-first-draw samples. Such systems must collect as many first-draw samples from appropriate taps as possible and identify sampling times and locations that would likely result in the longest standing time for the remaining sites. The State has the discretion to waive the requirement for prior State approval of non-first-draw sample sites selected by the system, either through State regulation or written notification to the system.

(c) *Number of samples*. Water systems shall collect at least one sample during each monitoring period specified in paragraph (d) of this section from the number of sites listed in the first column (''standard monitoring'') of the table in this paragraph. A system conducting reduced monitoring under paragraph (d)(4) of this section shall collect at least one sample from the number of sites specified in the second column (''reduced monitoring'') of the table in this paragraph during each monitoring period specified in paragraph (d)(4) of this section. Such reduced monitoring sites shall be representative of the sites required for standard monitoring. States may specify sampling locations when a system is conducting reduced monitoring. The table is as follows:

| System size (number of people served) | Number of sites (standard monitoring) | Number of sites (reduced monitoring) |
|---|---|---|
| >100,000 | 100 | 50 |
| 10,001 to 100,000 | 60 | 30 |
| 3,301 to 10,000 | 40 | 20 |
| 501 to 3,300 | 20 | 10 |
| 101 to 500 | 10 | 5 |
| ≤100 | 5 | 5 |

(d) *Timing of monitoring*—(1) *Initial tap sampling*.

The first six-month monitoring period for small, medium-size and large systems shall begin on the following dates:

| System size (No. people served) | First six-month monitoring period begins on |
|---|---|
| >50,000 | January 1, 1992. |
| 3,301 to 50,000 | July 1, 1992. |
| ≤3,300 | July 1, 1993. |

(i) All large systems shall monitor during two consecutive six-month periods.

(ii) All small and medium-size systems shall monitor during each six-month monitoring period until:

(A) The system exceeds the lead or copper action level and is therefore required to implement the corrosion control treatment requirements under §141.81, in which case the system shall continue monitoring in accordance with paragraph (d)(2) of this section, or

(B) The system meets the lead and copper action levels during two consecutive six-month monitoring periods, in which case the system may reduce monitoring in accordance with paragraph (d)(4) of this section.

(2) *Monitoring after installation of corrosion control and source water treatment.* (i) Any large system which installs optimal corrosion control treatment pursuant to §141.81(d)(4) shall monitor during two consecutive six-month monitoring periods by the date specified in §141.81(d)(5).

(ii) Any small or medium-size system which installs optimal corrosion control treatment pursuant to §141.81(e)(5) shall monitor during two consecutive six-month monitoring periods by the date specified in §141.81(e)(6).

(iii) Any system which installs source water treatment pursuant to §141.83(a)(3) shall monitor during two consecutive six-month monitoring periods by the date specified in §141.83(a)(4).

(3) *Monitoring after State specifies water quality parameter values for optimal corrosion control.* After the State specifies the values for water quality control parameters under §141.82(f), the system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the State specifies the optimal values under §141.82(f).

(4) *Reduced monitoring.* (i) A small or medium-size water system that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with paragraph (c) of this section, and reduce the frequency of sampling to once per year.

(ii) Any water system that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the State under §141.82(f) during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring to once per year and reduce the number of lead and copper samples in accordance with paragraph (c) of this section if it receives written approval from the State. The State shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with §141.90, and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring pursuant to this paragraph. The State shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

(iii) A small or medium-size water system that meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years. Any water system that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the State under §141.82(f) during three consecutive years of monitoring may reduce the frequency of monitoring from annually to once every three years if it receives written approval from the State. The State shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with §141.90, and shall notify the system in writing when it determines the system is eligible to reduce the frequency of monitoring to once every three years. The State shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

(iv) A water system that reduces the number and frequency of sampling shall collect these samples from representative sites included in the pool of targeted sampling sites identified in paragraph (a) of this section. Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August, or September unless the State has approved a different sampling period in accordance with paragraph (d)(4)(iv)(A) of this section.

(A) The State, at its discretion, may approve a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. Such a period shall be no longer than four consecutive months 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 shall designate a period that represents a time of normal operation for the system.

(B) Systems monitoring annually, that have been collecting samples during the months of June through September and that receive State approval to alter their sample collection period under paragraph (d)(4)(iv)(A) of this section, must collect their next round of samples during a time period that ends no later than 21 months after the previous round of sampling. Systems monitoring triennially that have been collecting samples during the months of June through September, and receive State approval to alter the sampling collection period as per paragraph (d)(4)(iv)(A) of this section, must collect their next round of samples during a time period that ends no later than 45 months after the previous round of sampling. Subsequent rounds of sampling must be collected annually or triennially, as required by this section. Small 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 sample collection period under paragraph (d)(4)(iv)(A) of this section must collect their next round of samples before the end of the 9-year period.

(v) Any water system that demonstrates for two consecutive 6-month monitoring periods that the tap water lead level computed under § 141.80(c)(3) is less than or equal to 0.005 mg/L and the tap water copper level computed under § 141.80(c)(3) is less than or equal to 0.65 mg/L may reduce the number of samples in accordance with paragraph (c) of this section and reduce the frequency of sampling to once every three calendar years.

(vi)(A) A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling in accordance with paragraph (d)(3) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section. Such a system shall also conduct water quality parameter monitoring in accordance with § 141.87(b), (c) or (d) (as appropriate) during the monitoring period in which it exceeded the action level. Any such system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in paragraph (c) of this section after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of paragraph (d)(4)(i) of this section and/or may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii) or (d)(4)(v) of this section.

(B) Any water system subject to the reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the State under § 141.82(f) for more than nine days in any six-month period specified in § 141.87(d) shall conduct tap water sampling for lead and copper at the frequency specified in paragraph (d)(3) of this section, collect the number of samples specified for standard monitoring under paragraph (c) of this section, and shall resume monitoring for water quality parameters within the distribution system in accordance with § 141.87(d). Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

(*1*) The system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in paragraph (c) of this section after it has completed two subsequent six-month rounds of monitoring that meet the criteria of paragraph (d)(4)(ii) of this section and the system has received written approval from the State that it is appropriate to resume reduced monitoring on an annual frequency.

(*2*) The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites

after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii) or (d)(4)(v) of this section and the system has received written approval from the State that it is appropriate to resume triennial monitoring.

(*3*) The system may reduce the number of water quality parameter tap water samples required in accordance with §141.87(e)(1) and the frequency with which it collects such samples in accordance with §141.87(e)(2). Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of §141.87(e)(2), that it has re-qualified for triennial monitoring.

(vii) Any water system subject to a reduced monitoring frequency under paragraph (d)(4) of this section that either adds a new source of water or changes any water treatment shall inform the State in writing in accordance with §141.90(a)(3). The State may require the system to resume sampling in accordance with paragraph (d)(3) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section or take other appropriate steps such as increased water quality parameter monitoring or re-evaluation of its corrosion control treatment given the potentially different water quality considerations.

(e) *Additional monitoring by systems.* The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the State in making any determinations (*i.e.*, calculating the 90th percentile lead or copper level) under this subpart.

(f) *Invalidation of lead or copper tap water samples.* A sample invalidated under this paragraph does not count toward determining lead or copper 90th percentile levels under §141.80(c)(3) or toward meeting the minimum monitoring requirements of paragraph (c) of this section.

(1) The State may invalidate a lead or copper tap water sample at least if one of the following conditions is met.

(i) The laboratory establishes that improper sample analysis caused erroneous results.

(ii) The State determines that the sample was taken from a site that did not meet the site selection criteria of this section.

(iii) The sample container was damaged in transit.

(iv) There is substantial reason to believe that the sample was subject to tampering.

(2) The system must report the results of all samples to the State and all supporting documentation for samples the system believes should be invalidated.

(3) To invalidate a sample under paragraph (f)(1) of this section, the decision and the rationale for the decision must be documented in writing. 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.

(4) 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) 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 invalidates the sample or by the end of the applicable monitoring period, whichever occurs later. Replacement samples taken after the end of the applicable monitoring period shall not also be used to meet the monitoring requirements of a subsequent monitoring period. The replacement samples shall be taken at the same locations as the invalidated samples or, if that is not possible, at locations other than those already used for sampling during the monitoring period.

(g) *Monitoring waivers for small systems.* Any small system that meets the criteria of this paragraph may apply to the State to reduce the frequency of monitoring for lead and copper under this section to once every nine years (*i.e.*, a ''full waiver'') if it meets all of the materials criteria specified in paragraph (g)(1) of this section and all of the monitoring criteria specified in paragraph (g)(2) of this section. If State regulations permit, any small system that meets the criteria in paragraphs (g)(1) and (2) of this section only for

lead, or only for copper, may apply to the State for a waiver to reduce the frequency of tap water monitoring to once every nine years for that contaminant only (*i.e.*, a ''partial 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, as follows:

(i) *Lead*. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for lead (*i.e.*, a ''lead waiver''), the water system must provide certification and supporting documentation to the State that the system 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, 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 full waiver, or a waiver of the tap water monitoring requirements for copper (*i.e.*, a ''copper waiver''), the water system must provide certification and supporting documentation to the State that the system contains no copper pipes or copper service lines.

(2) *Monitoring criteria for waiver issuance*. The system must have completed at least one 6-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) 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 full waiver, or 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 full waiver, or 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 shall notify the system of its waiver determination, in writing, setting forth the basis of its decision and any condition of the waiver. As a condition of the waiver, the State may require the system to perform specific activities (e.g., limited monitoring, periodic outreach to customers to remind them to avoid installation of materials that might void the waiver) to avoid the risk of lead or copper concentration of concern in tap water. The small system must continue monitoring for lead and copper at the tap as required by paragraphs (d)(1) through (d)(4) of this section, as appropriate, until it receives written notification from the State that the waiver has been approved.

(4) *Monitoring frequency for systems with waivers*. (i) A system with a full waiver must conduct tap water monitoring for lead and copper in accordance with paragraph (d)(4)(iv) of this section at the reduced number of sampling sites identified in paragraph (c) of this section at least once every nine years and provide the materials certification specified in paragraph (g)(1) of this section for both lead and copper to the State along with the monitoring results.

(ii) A system with a partial waiver must conduct tap water monitoring for the waived contaminant in accordance with paragraph (d)(4)(iv) of this section at the reduced number of sampling sites specified in paragraph (c) of this section at least once every nine years and provide the materials certification specified in paragraph (g)(1) of this section pertaining to the waived contaminant along with the monitoring results. Such a system also must continue to monitor for the non-waived contaminant in accordance with requirements of paragraph (d)(1) through (d)(4) of this section, as appropriate.

(iii) If a system with a full or partial waiver adds a new source of water or

changes any water treatment, the system must notify the State in writing in accordance with §141.90(a)(3). The State has the authority to require the system to 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 it deems such modifications are necessary to address treatment or source water changes at the system.

(iv) If a system with a full or partial waiver becomes aware that it 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 shall notify the State in writing no later than 60 days after becoming aware of such a change.

(5) *Continued eligibility*. If the system continues to satisfy the requirements of paragraph (g)(4) of this section, the waiver will be renewed automatically, unless any of the conditions listed in paragraph (g)(5)(i) through (g)(5)(iii) of this section occurs. A system whose waiver has been revoked may re-apply for a waiver at such time as it again meets the appropriate materials and monitoring criteria of paragraphs (g)(1) and (g)(2) of this section.

(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 full or partial waiver has been revoked by the State is subject to the corrosion control treatment and lead and copper tap water monitoring requirements, as follows:

(i) If the system exceeds the lead and/or copper action level, the system must implement corrosion control treatment in accordance with the deadlines specified in §141.81(e), and any other applicable requirements of this subpart.

(ii) If the system meets both the lead and the copper action level, the system must monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sample sites specified in paragraph (c) of this section.

(7) *Pre-existing waivers*. Small system waivers approved by the State in writing prior to April 11, 2000 shall remain in effect under the following conditions:

(i) 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, the waiver remains in effect so long as the system continues to meet the waiver eligibility criteria of paragraph (g)(5) of this section. The first round of tap water monitoring conducted pursuant to paragraph (g)(4) of this section shall be completed no later than nine years after the last time the system has monitored for lead and copper at the tap.

(ii) If the system has met the materials criteria of paragraph (g)(1) of this section but has not met the monitoring criteria of paragraph (g)(2) of this section, the system shall conduct a round of monitoring for lead and copper at the tap demonstrating that it meets the criteria of paragraph (g)(2) of this section no later than September 30, 2000. Thereafter, the waiver shall remain in effect as long as the system meets the continued eligibility criteria of paragraph (g)(5) of this section. The first round of tap water monitoring conducted pursuant to paragraph (g)(4) of this section shall be completed no later than nine years after the round of monitoring conducted pursuant to paragraph (g)(2) of this section.

[56 FR 26548, June 7, 1991; 56 FR 32113, July 15, 1991; 57 FR 28788, June 29, 1992; as amended at 65 FR 2007, Jan. 12, 2000]

### §141.87 Monitoring requirements for water quality parameters.

All large water systems, and all small- and medium-size systems that exceed the lead or copper action level

shall monitor water quality parameters in addition to lead and copper in accordance with this section. The requirements of this section are summarized in the table at the end of this section.

(a) *General requirements*—(1) *Sample collection methods.* (i) Tap samples shall be representative of water quality throughout the distribution system taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Tap sampling under this section is not required to be conducted at taps targeted for lead and copper sampling under §141.86(a). [Note: Systems may find it convenient to conduct tap sampling for water quality parameters at sites used for coliform sampling under 40 CFR 141.21.]

(ii) Samples collected at the entry point(s) to the distribution system shall be from locations representative of each source after treatment. 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).

(2) *Number of samples.* (i) Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under paragraphs (b) through (e) of this section from the following number of sites.

| System size (No. people served) | No. of sites for water quality parameters |
|---|---|
| >100,000 | 25 |
| 10,001–100,000 | 10 |
| 3,301 to 10,000 | 3 |
| 501 to 3,300 | 2 |
| 101 to 500 | 1 |
| ≤100 | 1 |

(ii) Except as provided in paragraph (c)(3) of this section, systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in paragraph (b) of this section. During each monitoring period specified in paragraphs (c)–(e) of this section, systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.

(b) *Initial sampling* All large water systems shall measure the applicable water quality parameters as specified below at taps and at each entry point to the distribution system during each six-month monitoring period specified in §141.86(d)(1). All small and medium-size systems shall measure the applicable water quality parameters at the locations specified below during each six-month monitoring period specified in §141.86(d)(1) during which the system exceeds the lead or copper action level.

(1) At taps:

(i) pH;

(ii) Alkalinity;

(iii) Orthophosphate, when an inhibitor containing a phosphate compound is used;

(iv) Silica, when an inhibitor containing a silicate compound is used;

(v) Calcium;

(vi) Conductivity; and

(vii) Water temperature.

(2) At each entry point to the distribution system: all of the applicable parameters listed in paragraph (b)(1) of this section.

(c) *Monitoring after installation of corrosion control.* Any large system which installs optimal corrosion control treatment pursuant to §141.81(d)(4) shall measure the water quality parameters at the locations and frequencies specified below during each six-month monitoring period specified in §141.86(d)(2)(i). Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each six-month monitoring period specified in §141.86(d)(2)(ii) in which the system exceeds the lead or copper action level.

(1) At taps, two samples for:

(i) pH;

(ii) Alkalinity;

(iii) Orthophosphate, when an inhibitor containing a phosphate compound is used;

(iv) Silica, when an inhibitor containing a silicate compound is used;

(v) Calcium, when calcium carbonate stabilization is used as part of corrosion control.

(2) Except as provided in paragraph (c)(3) of this section, at each entry point to the distribution system, at least one sample no less frequently than every two weeks (biweekly) for:

(i) pH;

(ii) When alkalinity is adjusted as part of optimal corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity, and the alkalinity concentration; and

(iii) When a corrosion inhibitor is used as part of optimal corrosion control, a reading of the dosage rate of the inhibitor used, and the concentration of orthophosphate or silica (whichever is applicable).

(3) Any ground water system can limit entry point sampling described in paragraph (c)(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, the system shall provide to the State written information identifying the selected entry points and documentation, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

(d) *Monitoring after State specifies water quality parameter values for optimal corrosion control.* After the State specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under §141.82(f), all large systems shall measure the applicable water quality parameters in accordance with paragraph (c) of this section and determine compliance with the requirements of §141.82(g) every six months with the first six-month period to begin on the date the State specifies the optimal values under §141.82(f). Any small or medium-size system shall conduct such monitoring during each six-month period specified in this paragraph in which the system exceeds the lead or copper action level. For any such small and medium-size system that is subject to a reduced monitoring frequency pursuant to §141.86(d)(4) at the time of the action level exceedance, the end of the applicable six-month period under this paragraph shall coincide with the end of the applicable monitoring period under §141.86(d)(4). Compliance with State-designated optimal water quality parameter values shall be determined as specified under §141.82(g).

(e) *Reduced monitoring.* (1) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment during each of two consecutive six-month monitoring periods under paragraph (d) of this section shall continue monitoring at the entry point(s) to the distribution system as specified in paragraph (c)(2) of this section. Such system may collect two tap samples for applicable water quality parameters from the following reduced number of sites during each six-month monitoring period.

| System size (No. of people served) | Reduced No. of sites for water quality parameters |
|---|---|
| >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) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under §141.82(f) during three consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in this paragraph (e)(1) of this section from every six months to annually. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under §141.82(f) during three consecutive years of annual monitoring under this paragraph may reduce the frequency with which it collects the number of tap samples

for applicable water quality parameters specified in paragraph (e)(1) from annually to every three years.

(ii) A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in paragraph (e)(1) of this section to every three years 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 PQL for lead specified in § 141.89 (a)(1)(ii), that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L for copper in § 141.80(c)(2), and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under § 141.82(f).

(3) A water system that conducts sampling annually shall collect these samples evenly throughout the year so as to reflect seasonal variability.

(4) Any water system subject to the reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the State in § 141.82(f) for more than nine days in any six-month period specified in § 141.82(g) shall resume distribution system tap water sampling in accordance with the number and frequency requirements in paragraph (d) of this section. Such a system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites specified in paragraph (e)(1) of this section after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of that paragraph and/or may resume triennial monitoring for water quality parameters at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (e)(2)(i) or (e)(2)(ii) of this section.

(f) *Additional monitoring by systems.* The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the State in making any determinations (*i.e.*, determining concentrations of water quality parameters) under this section or § 141.82.

SUMMARY OF MONITORING REQUIREMENTS FOR WATER QUALITY PARAMETERS [1]

| Monitoring period | Parameters [2] | Location | Frequency |
|---|---|---|---|
| Initial monitoring | pH, alkalinity, orthophosphate or silica [3], calcium, conductivity, temperature. | Taps and at entry point(s) to distribution system. | Every 6 months. |
| After installation of corrosion control. | pH, alkalinity, orthophosphate or silica [3], calcium [4]. | Taps | Every 6 months. |
| | pH, alkalinity, dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual [5]. | Entry point(s) to distribution system [6]. | No less frequently than every two weeks. |
| After State specifies parameter values for optimal corrosion control. | pH, alkalinity, orthophosphate or silica [3], calcium [4]. | Taps | Every 6 months. |
| | pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual [5]. | Entry point(s) to distribution system [6]. | No less frequently than every two weeks. |
| Reduced monitoring | pH, alkalinity, orthophosphate or silica [3], calcium [4]. | Taps | Every 6 months, annually [7] or every 3 years [8]; reduced number of sites. |
| | pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual [5]. | Entry point(s) to distribution system [6]. | No less frequently than every two weeks. |

[1] Table is for illustrative purposes; consult the text of this section for precise regulatory requirements.
[2] Small and medium-size systems have to monitor for water quality parameters only during monitoring periods in which the system exceeds the lead or copper action level.
[3] Orthophosphate must be measured only when an inhibitor containing a phosphate compound is used. Silica must be measured only when an inhibitor containing silicate compound is used.
[4] Calcium must be measured only when calcium carbonate stabilization is used as part of corrosion control.
[5] Inhibitor dosage rates and inhibitor residual concentrations (orthophosphate or silica) must be measured only when an inhibitor is used.
[6] Ground water systems may limit monitoring to representative locations throughout the system.

[7] Water systems may reduce frequency of monitoring for water quality parameters at the tap from every six months to annually if they have maintained the range of values for water quality parameters reflecting optimal corrosion control during 3 consecutive years of monitoring.

[8] Water systems may further reduce the frequency of monitoring for water quality parameters at the tap from annually to once every 3 years if they have maintained the range of values for water quality parameters reflecting optimal corrosion control during 3 consecutive years of annual monitoring. Water systems may accelerate to triennial monitoring for water quality parameters at the tap if they have maintained 90th percentile lead levels less than or equal to 0.005 mg/L, 90th percentile copper levels less than or equal to 0.65 mg/L, and the range of water quality parameters designated by the State under § 141.82(f) as representing optimal corrosion control during two consecutive six-month monitoring periods.

[56 FR 26548, June 7, 1991; 57 FR 28788, June 29, 1992, as amended at 59 FR 33862, June 30, 1994; 65 FR 2010, Jan. 12, 2000]

## § 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 which is representative of each well 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 shall collect one source water sample from each entry point to the distribution system within six months after the exceedance.

(c) *Monitoring frequency after installation of source water treatment.* Any system which installs source water treatment pursuant to § 141.83(a)(3) shall collect an additional 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).

(d) *Monitoring frequency after State specifies maximum permissible source water levels or determines that source water treatment is not needed.* (1) A system shall monitor at the frequency specified below in cases where the State specifies maximum permissible source water levels under § 141.83(b)(4) or determines that the system is not required to install source water treatment under § 141.83(b)(2).

(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.

(ii) A water system using surface water (or a combination of surface and groundwater) shall collect samples once during each year, the first annual monitoring period to begin on the date on 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 ground water 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) if the system meets one of 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 compliance periods under paragraph (d)(1) of this section; or

(ii) The State has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive compliance periods in which sampling was conducted under paragraph (d)(1) of this section, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

(2) A water system using surface water (or a combination of surface water and ground water) 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) if the system meets one of 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; or

(ii) The State has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive years, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

(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]

### § 141.89 Analytical methods.

(a) Analyses for lead, copper, pH, conductivity, calcium, alkalinity, orthophosphate, silica, and temperature shall be conducted with the methods in § 141.23(k)(1).

(1) Analyses for alkalinity, calcium, conductivity, orthophosphate, pH, silica, and temperature 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: ±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: ±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 the method detection limit for lead of 0.001 mg/L according to the procedures in appendix B of part 136 of this title. This need only be accomplished if the laboratory will be processing source water composite samples under §141.88(a)(1)(iii).

(iv) Be currently certified by EPA or the State to perform analyses to the specifications described in paragraph (a)(2) 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]

### § 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 water monitoring for lead and copper and for water quality parameter monitoring.* (1) Except as provided in paragraph (a)(1)(viii) of this section, a water system shall report the information specified below for all tap water samples specified in §141.86 and for all water quality parameter samples specified in §141.87 within the first 10 days following the end of each applicable monitoring period specified in §141.86 and §141.87 (*i.e.*, every six months, annually, every 3 years, or every 9 years):

(i) The results of all tap samples for lead and copper including the location of each site and the criteria under §141.86(a) (3), (4), (5), (6), and/or (7) under which the site was selected for the 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)(2);

(iii) [Reserved]

(iv) The 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period (calculated in accordance with §141.80(c)(3)), unless the State calculates the 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(d)(1), the system shall designate any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;

(vi) The results of all tap samples for pH, and where applicable, alkalinity, calcium, conductivity, temperature, and orthophosphate or silica collected under §141.87 (b)–(e);

(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)–(e);

(viii) A water system shall report the results of all water quality parameter samples collected under §141.87(c) through (f) during each six-month monitoring period specified in §141.87(d) within the first 10 days following the end of the monitoring period unless the State has specified a more frequent reporting requirement.

(2) For a non-transient non-community water system, or a community water system meeting the criteria of §§141.85(c)(7)(i) and (ii), that does not have enough taps that can provide first-draw samples, the system must either:

(i) Provide written documentation to the State identifying standing times and locations for enough non-first-draw samples to make up its sampling pool under §141.86(b)(5) by the start of the first applicable monitoring period under §141.86(d) that commences after April 11, 2000, unless the State has waived prior State approval of non-first-draw sample sites selected by the system pursuant to §141.86(b)(5); or

(ii) If the State has waived prior approval of non-first-draw sample sites selected by the system, identify, in writing, each site that did not meet the six-hour minimum standing time and the length of standing time for that particular substitute sample collected pursuant to §141.86(b)(5) and include this information with the lead and copper tap sample results required to be submitted pursuant to paragraph (a)(1)(i) of this section.

(3) No later than 60 days after the addition of a new source or any change in water treatment, unless the State requires earlier notification, a water system deemed to have optimized corrosion control under §141.81(b)(3), a water system subject to reduced monitoring pursuant to §141.86(d)(4), or a water system subject to a monitoring waiver pursuant to §141.86(g), shall send written documentation to the State describing the change. In those instances where prior State approval of the treatment change or new source is not required, water systems are encouraged to provide the notification to the State beforehand to minimize the risk the treatment change or new source will adversely affect optimal corrosion control.

(4) Any small system applying for a monitoring waiver under §141.86(g), or subject to a waiver granted pursuant to §141.86(g)(3), shall provide the following information to the State in writing by the specified deadline:

(i) By the start of the first applicable monitoring period in §141.86(d), any small water system applying for a monitoring waiver shall provide the documentation required to demonstrate that it meets the waiver criteria of §§141.86(g)(1) and (2).

(ii) No later than nine years after the monitoring previously conducted pursuant to §141.86(g)(2) or §141.86(g)(4)(i), each small system desiring to maintain its monitoring waiver shall provide the information required by §§141.86(g)(4)(i) and (ii).

(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 small system with a monitoring waiver shall provide written notification to the State, setting forth the circumstances resulting in the lead-containing and/or copper-containing materials being introduced into the system and what corrective action, if any, the system plans to remove these materials.

(iv) By October 10, 2000, any small system with a waiver granted prior to April 11, 2000 and that has not previously met the requirements of §141.86(g)(2) shall provide the information required by that paragraph.

(5) Each ground water system that limits water quality parameter monitoring to a subset of entry points under §141.87(c)(3) shall 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.* (1) A water system shall report the sampling results for all

source water samples collected in accordance with § 141.88 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.

(2) With the exception of the first round of source water sampling conducted pursuant to § 141.88(b), the system shall specify any site which was not sampled during previous monitoring periods, 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 systems demonstrating that they have already optimized corrosion control, information required in § 141.81(b) (2) or (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 optimal corrosion control designated by the State under § 141.82(d), a letter certifying that the system has completed installing that treatment.

(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) *Lead service line replacement reporting requirements.* Systems shall report the following information to the State to demonstrate compliance with the requirements of § 141.84:

(1) Within 12 months after a system exceeds the lead action level in sampling referred to in § 141.84(a), the system shall demonstrate in writing to the State that it has conducted a material evaluation, including the evaluation in § 141.86(a), to identify the initial number of lead service lines in its distribution system, and shall provide the State with the system's schedule for replacing annually at least 7 percent of the initial number of lead service lines in its distribution system.

(2) Within 12 months after a system exceeds the lead action level in sampling referred to in § 141.84(a), and every 12 months thereafter, the system shall demonstrate to the State in writing that the system has either:

(i) Replaced in the previous 12 months at least 7 percent of the initial lead service lines (or a greater number of lines specified by the State under § 141.84(e)) in its distribution system, or

(ii) Conducted sampling which demonstrates that the lead concentration in all service line samples from an individual line(s), taken pursuant to § 141.86(b)(3), is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced and/or which meet the criteria in § 141.84(c) shall equal at least 7 percent of the initial number of lead lines identified under paragraph (a) of this section (or the percentage specified by the State under § 141.84(e)).

(3) The annual letter submitted to the State under paragraph (e)(2) of this section shall contain the following information:

(i) The number of lead service lines scheduled to be replaced during the previous year of the system's replacement schedule;

(ii) The number and location of each lead service line replaced during the previous year of the system's replacement schedule;

(iii) If measured, the water lead concentration and location of each lead service line sampled, the sampling method, and the date of sampling.

(4) Any system which collects lead service line samples following partial lead service line replacement required by § 141.84 shall report the results to the State within the first ten days of the month following the month in which the system receives the laboratory results, or as specified by the State. States, at their discretion may eliminate this requirement to report these monitoring results. Systems

shall 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 service line replacement activities have taken place.

(f) *Public education program reporting requirements.* (1) Any water system that is subject to the public education requirements in § 141.85 shall, within ten days after the end of each period in which the system is required to perform public education tasks in accordance with § 141.85(c), send written documentation to the State that contains:

(i) A demonstration that the system has delivered the public education materials that meet the content requirements in § 141.85(a) and (b) and the delivery requirements in § 141.85(c); 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.

(2) Unless required by the State, a system that previously has submitted the information required by paragraph (f)(1)(ii) of this section need not resubmit the information required by paragraph (f)(1)(ii) of this section, 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.

(g) *Reporting of additional monitoring data.* Any system which collects sampling data in addition to that required by this subpart shall report the results to the State within the first ten days following the end of the applicable monitoring period under §§ 141.86, 141.87 and 141.88 during which the samples are collected.

(h) *Reporting of 90th percentile lead and copper concentrations where the State calculates a system's 90th percentile concentrations.* A water system is not required to report the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period, as required by paragraph (a)(1)(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 has specified a date before the end of the applicable monitoring period by which the system must provide the results of lead and copper tap water samples;

(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 criteria under § 141.86(a)(3), (4), (5), (6), and/or (7) under which the site was selected for the system's sampling pool, pursuant to paragraph (a)(1)(i) of this section; and

(ii) An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation 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 before the end of the monitoring period.

[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]

### § 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. Each water system shall retain the records required by this section for no fewer than 12 years.

## 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*. 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*.

Standard Methods 4500–Cl D, 4500–Cl E, 4500–Cl F, 4500–Cl G, 4500–Cl H, 500–Cl I, 4500–$ClO_2$ D, 4500–$ClO_2$ 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–$ClO_2$ 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:

APPROVED METHODS FOR DISINFECTION BYPRODUCT COMPLIANCE MONITORING

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

[1] P&T = purge and trap; GC = gas chromatography; 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.
[2] 19th and 20th editions of Standard Methods for the Examination of Water and Wastewater, 1995 and 1998, respectively, American Public Health Association; either of these editions may be used.
[3] Annual Book of ASTM Standards, 2001 or any year containing the cited version of the method, Vol 11.01.
[4] If TTHMs are the only analytes being measured in the sample, then a PID is not required.
[5] The samples must be extracted within 14 days of sample collection.
[6] Ion chromatography & post column reaction or IC/ICP-MS must be used for monitoring of bromate for purposes of demonstrating eligibility of reduced monitoring, as prescribed in § 141.132(b)(3)(ii).
[7] Samples must be preserved at the time of sampling with 50 mg ethylenediamine (EDA)/L of sample and must be analyzed within 28 days.
[8] Amperometric titration or spectrophotometry may be used for routine daily monitoring of chlorite at the entrance to the distribution system, as prescribed in § 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).
[9] The Standard Methods Online version that is approved is indicated by the last two digits in the method number which is the year of approval by the Standard Method Committee. Standard Methods Online are available at *http://www.standardmethods.org.*

(2) Analyses under this section for disinfection byproducts must be conducted by laboratories that have received certification by EPA or the State, except as specified under paragraph (b)(3) of this section. To receive certification to conduct 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 ±50% and ±15% of the study mean.

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

| DBP | Acceptance limits (percent of true value) | Comments |
|---|---|---|
| TTHM | | |
| Chloroform | ±20 | Laboratory must meet all 4 individual THM acceptance limits in order to successfully pass a PE sample for TTHM |
| Bromodichloromethane. | ±20 | |
| Dibromochloromethane. | ±20 | |
| Bromoform | ±20 | |

| DBP | Acceptance limits (percent of true value) | Comments |
|---|---|---|
| HAA5 | | |
| Monochloroacetic Acid. | ±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. | ±40 | |
| Trichloroacetic Acid. | ±40 | |
| Monobromoacetic Acid. | ±40 | |
| Dibromoacetic Acid. | ±40 | |
| Chlorite | ±30 | |
| Bromate | ±30 | |

(iv) Beginning April 1, 2007, report quantitative data for concentrations at least as low as the ones listed in the following table for all DBP samples analyzed for compliance with §§ 141.64, 141.135, and subparts U and V of this part:

| DBP | Minimum reporting level (mg/L) [1] | Comments |
|---|---|---|
| TTHM [2] | | |
| Chloroform | 0.0010 | |
| Bromodichloromethane | 0.0010 | |
| Dibromochloromethane | 0.0010 | |
| Bromoform | 0.0010 | |
| HAA5 [2] | | |
| Monochloroacetic Acid | 0.0020 | |
| Dichloroacetic Acid | 0.0010 | |
| Trichloroacetic Acid | 0.0010 | |
| Monobromoacetic Acid | 0.0010 | |
| Dibromoacetic Acid | 0.0010 | |
| Chlorite | 0.020 | Applicable to monitoring as prescribed in § 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 bromate. |

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

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

(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 concentrations for free chlorine, combined chlorine (chloramines), and chlorine dioxide by the methods listed in the following table:

| Methodology | SM (19th or 20th ed) | SM Online [2] | ASTM method | EPA method | Residual measured [1] | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Free $Cl_2$ | Combined $Cl_2$ | Total $Cl_2$ | $ClO_2$ |
| Amperometric Titration | 4500–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–$ClO_2$ D | | | | | | | X |
| Amperometric Method II | 4500–$ClO_2$ E | 4500–$ClO_2$ E–00 | | | | | | X |
| Lissamine Green Spectrophotometric | | | | 327.0 Rev 1.1 | | | | X |

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

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

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

(3) 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. 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 μm pore-diameter filter as soon as practical after sampling, not to exceed 48 hours. After filtration, DOC samples must be acidified to achieve pH less than or equal to 2 with minimal addition of the acid specified in the method or by the instrument manufacturer. Acidified DOC samples must be analyzed within 28 days of sample collection. Inorganic carbon must be removed from the samples prior to analysis. Water passed through the filter prior to filtration of the sample must serve as the filtered blank. This filtered blank must be analyzed using procedures identical to those used for analysis of the samples and must meet the following criteria: DOC < 0.5 mg/L.

(ii) Ultraviolet Absorption at 254 nm ($UV_{254}$). 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 μm 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]

### § 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. [1] |
| Subpart H system serving from 500 to 9,999 persons. | One water sample per quarter per treatment plant. | Locations representing maximum residence time. [1] |
| 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. [1] If the sample (or average of annual samples, if more than one sample is taken) exceeds the MCL, the system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until 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 [2]. | Locations representing maximum residence time. [1] |
| 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 [2] during month of warmest water temperature. | Locations representing maximum residence time. [1] If the sample (or average of annual samples, if more than one sample is taken) exceeds 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. |

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

[2] Multiple wells drawing water from a single aquifer may be considered one treatment plant for determining the minimum number of samples required, with State approval in accordance with criteria 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, ≤4.0 mg/L. | TTHM annual average ≤0.040 mg/L and HAA5 annual average ≤0.030 mg/L. | One sample per treatment plant per quarter at distribution system location reflecting maximum residence time. |

REDUCED MONITORING FREQUENCY FOR TTHM AND HAA5—Continued

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

(iii) *Monitoring requirements for source water TOC*. In order to qualify for reduced monitoring for TTHM and HAA5 under paragraph (b)(1)(ii) 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 ≤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 ≤0.060 mg/L and their HAA5 annual average is ≤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 ≥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 ≤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 ≤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.* Community and nontransient noncommunity 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. Subpart H systems 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 ≥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]

### § 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 f 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.<br>(ii) The location, date, and result of each sample taken during the last quarter.<br>(iii) The arithmetic average of all samples taken in the last quarter.<br>(iv) The annual arithmetic average of the quarterly arithmetic averages of this section for the last four quarters.<br>(v) Whether, based on § 141.133(b)(1), the MCL was violated. |
| (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.<br>(ii) The location, date, and result of each sample taken during the last monitoring period.<br>(iii) The arithmetic average of all samples taken over the last year.<br>(iv) Whether, based on § 141.133(b)(1), the MCL was violated. |
| (3) System monitoring for TTHMs and HAA5 under the requriements of § 141.132(b) less frequently than annually. | (i) The location, date, and result of each sample taken<br>(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.<br>(ii) The location, date, and result of each sample (both entry point and distribution system) taken during the last quarter.<br>(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.<br>(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.<br>(ii)The location, date, and result of each sample taken during the last quarter.<br>(iii) The arithmetic average of the monthly arithmetic averages of all samples taken in the last year.<br>(iv) Whether, based on § 141.133(b)(2), the MCL was violated. |

[1] 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.<br>(ii) The month arithmetic average of all samples taken in each month for the last 12 months.<br>(iii) The arithmetic average of the monthly averages for the last 12 months.<br>(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.<br>(ii) Whether, based on § 141.133(c)(2), the MRDL was violated.<br>(iii) Whether the MRDL was exceeded in any two consecutive daily samples and whether the resulting violation was acuate or nonacute. |

[1] 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... [1] |
|---|---|
| (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) or (3). | (i) The number of paired (source water and treated water) samples taken during the last quarter.<br>(ii) The location, date, and results of each paired sample and associated alkalinity taken during the last quarter.<br>(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.<br>(iv) Calculations for determining compliance with the TOC percent removal requirements, as provided in § 141.135(c)(1).<br>(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. |
| (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). | (i) The alternative compliance criterion that the system is using.<br>(ii) The number of paired samples taken during the last quarter.<br>(iii) The location, date, and result of each paired sample and associated alkalinity taken during the last quarter.<br>(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).<br>(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).<br>(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).<br>(vii) The running annual average for both TTHM and HAA5 for systems meeting the criterion in § 141.135(a)(2)(iii) or (iv).<br>(viii) The running annual average of the amount of magnesium hardness removal (as $CaCO_3$, in mg/L) for systems meeting the criterion in § 141.135(a)(3)(ii).<br>(ix) Whether the system is in compliance with the particular alternative compliance criterion in § 141.135(a)(2) or (3). |

[1] 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 $CaCO_3$), 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 $CaCO_3$), 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 $CaCO_3$), 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 [1,2]

| Source-water TOC, mg/L | Source-water alkalinity, mg/L as $CaCO_3$ (in precentages) | | |
|---|---|---|---|
| | 0–60 | >60–120 | >120 [3] |
| >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 |

[1] 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.
[2] Softening system meeting one of the alternative compliance criteria in paragraph (a)(3) of this section are not required to operate with enhanced softening.
[3] 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 $CaCO_3$) | Target pH |
|---|---|
| 0–60 | 5.5 |
| >60–120 | 6.3 |
| >120–240 | 7.0 |

ENHANCED COAGULATION STEP 2 TARGET pH—Continued

| Alkalinity (mg/L as $CaCO_3$) | Target pH |
|---|---|
| >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 equivalant addition of iron coagulant) is reached.

(iv) The system may operate at any coagulant dose or pH necessary (consistent with other NPDWRs) 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 equivalant 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 $CaCO_3$), 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 $CaCO_3$), 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 annual 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.

(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.

(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), at or above the levels prescribed by § 141.131(b)(2)(iv) for the contaminants or contaminant groups listed in § 141.64, and at or above the levels prescribed by § 141.25(c) for radioactive contaminants.

(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 §§ 141.154 and 141.155 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 rule. 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]

### § 141.152 Effective dates.

(a) The regulations in this subpart shall take effect on September 18, 1998.

(b) Each existing community water system must deliver its first report by October 19, 1999, its second report by July 1, 2000, and subsequent reports by July 1 annually thereafter. The first report must contain data collected during, or prior to, calendar year 1998 as prescribed in § 141.153(d)(3). Each report thereafter must contain data collected during, or prior to, 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 and annually thereafter.

(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) No later than April 19, 1999, by April 1, 2000, and by April 1 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.

**§ 141.153 Content of the reports.**

(a) Each community water system must provide to its customers an annual report that contains the information specified in this section and § 141.154.

(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 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.

(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.

(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).

(ii) Contaminants for which monitoring is required by § 141.40 (unregulated contaminants); and

(iii) Disinfection by-products or microbial contaminants for which monitoring is required by §§ 141.142 and 141.143, except as provided under paragraph (e)(1) of this section, and which are detected in the finished water.

(2) The data relating to these contaminants must 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 calendar year 1998 for the first report and subsequent calendar years thereafter except that:

(i) Where a system is allowed to monitor for regulated contaminants less often than once a year, the table(s) 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) Results of monitoring in compliance with §§141.142 and 141.143 need only be included for 5 years from the date of last sample or until any of the detected contaminants becomes regulated and subject to routine monitoring requirements, whichever comes first.

(4) For detected regulated contaminants (listed in appendix A to this subpart), the table(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 table 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 total coliforms, 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 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.

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

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 value of the most recent round of sampling and the number of sampling sites exceeding the action level;

(vii) For total coliform:

(A) The highest monthly number of positive samples for systems collecting fewer than 40 samples per month; or

(B) The highest monthly percentage of positive samples for systems collecting at least 40 samples per month;

(viii) For fecal coliform: The total number of positive samples; and

(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.

(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 table should contain a separate column for each service area and the report should identify each separate distribution system. Alternatively, systems could produce separate reports tailored to include data for each service area.

(6) The table(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 (except *Cryptosporidium*), the table(s) must contain the average and range at which the contaminant was detected. The report may include a brief explanation of the reasons for monitoring for unregulated contaminants.

(e) Information on *Cryptosporidium*, radon, and other contaminants:

(1) If the system has performed any monitoring for *Cryptosporidium*, including monitoring performed to satisfy the requirements of § 141.143, 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 calling the Safe Drinking Water Hotline (800–426–4791). 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 § 141.153(d)(6), the report must note any violation that occurred during the year 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(d), 141.81, 141.82, 141.83 or 141.84, 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) or systems may use their own comparable language. The report also must include the language of paragraph (h)(1)(iv) of this section.

(i) The sources of drinking water (both tap water and bottled water) include 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, and can pick up substances resulting from the presence of animals or from human activity.

(ii) 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 be naturally-occurring or 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 be naturally-occurring or be the result of oil and gas production and mining activities.

(iii) In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA 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 indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800–426–4791).

(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.

(3) In communities with a large proportion of non-English speaking residents, as determined by the Primacy Agency, the report must contain information in the appropriate language(s)

regarding the importance of the report or contain a telephone number or address where such residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language.

(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.

[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]

### § 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).

(b) Ending in the report due by July 1, 2001, a system which detects arsenic at levels above 0.025 mg/L, but below the 0.05 mg/L, and beginning in the report due by July 1, 2002, 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: While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

(2) May write its own educational statement, but only in consultation with 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: Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

(2) May write its own educational statement, but only in consultation with the Primacy Agency.

(d) Systems which detect lead above the action level in more than 5%, and up to and including 10%, of homes sampled:

(1) Must include a short informational statement about the special impact of lead on children using language such as: Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested and flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the Safe Drinking Water Hotline (800–426–4791).

(2) May write its own educational statement, but only in consultation with the Primacy Agency.

(e) Community water systems that detect TTHM above 0.080 mg/l, but below the MCL in § 141.12, as an annual average, monitored and calculated under the provisions of § 141.30, must

include health effects language for TTHMs prescribed by appendix A.

(f) Beginning in the report due by July 1, 2002, and ending January 22, 2006, a community water system that detects arsenic above 0.010 mg/L and up to and including 0.05 mg/L must include the arsenic health effects language prescribed by Appendix A to Subpart O of this part.

[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]

### § 141.155 Report delivery and recordkeeping.

(a) Except as provided in paragraph (g) of this section, each community water system must mail or otherwise directly deliver one copy of the report to each customer.

(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 would include a mix of methods appropriate to the particular system such as: Posting the reports on the Internet; mailing to postal patrons in metropolitan areas; advertising the availability of the report in the news media; publication in a local newspaper; posting 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.

(c) No later than the date the system is required to distribute the report to its customers, each community water system must mail a copy of the report to the primacy agency, followed within 3 months by a certification that the report has 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.

(f) Each community water system serving 100,000 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 his 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 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 at least once per year to their customers by mail, door-to-door delivery or by posting in an appropriate location that the report is available upon request.

(h) Any system subject to this subpart must retain copies of its Consumer Confidence Report for no less than 3 years.

[63 FR 44526, Aug. 19, 1998, as amended at 65 FR 26023, May 4, 2000]

## 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 | MCL: (systems that collect ≥40 samples/month) 5% of monthly samples are positive; (systems that collect <40 samples/month) 1 positive monthly sample. | ..... | MCL: (systems that collect ≥40 samples/month) 5% of monthly samples are positive; (systems that collect <40 samples/month) 1 positive monthly sample. | 0 | Naturally present in the environment. | Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. |
| Fecal coliform and E. coli | 0 | ..... | 0 | 0 | Human and animal fecal waste | Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely-compromised immune systems. |
| Total organic carbon (ppm). | TT | ..... | TT | N/A | Naturally present in the environment. | Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection by products. These by-products include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these by-products 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. |

| 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 | 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. |
| 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 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. |
| Alpha emitters (pCi/L) | 15 pCi/L | – | 15 | 0 | Erosion of natural deposits | 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. |
| 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 increased risk of getting cancer. |
| Uranium (pCi/L) | 30 µg/L | – | 30 | 0 | Erosion of natural deposits | 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) | [1] 0.010 | 1000 | [1] 10. | [1] 0 | Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes. | 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. |
| Asbestos (MFL) | 7 MFL | | 7 | 7 | Decay of asbestos cement water mains; Erosion of natural deposits. | 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-burning factories; Discharge from electrical, aerospace, and defense industries. | Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions |
| Bromate (ppb) | .010 | 1000 | 10 | 0 | By-product of drinkig water disinfection. | 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 waste batteries and paints. | Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage. |
| Chloramines (ppm) | MRDL=4 | | MRDL=4 | MRDLG=4 | 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. |

| 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 (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 the MRDL could experience stomach discomfort. |
| Chlorine dioxide (ppb) | MRDL=.8 | 1000 | MRDL=800 | MRDLG=800 | Water additive used to control micorbes. | Some infants and young children who drink water 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 water containing chlorite in excess of the MCL. Some people may experience anemia. |
| Chromium (ppb) | .1 | 1000 | 100 | 100 | Discharge from steel and pulp mills; Erosion of natural deposits. | 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 gastro-intestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their personal doctor. |
| Cyanide (ppb) | .2 | 1000 | 200 | 200 | Discharge from steel/metal factories; Discharge from plastic and fertilizer factories. | 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 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. |
| Lead (ppb) | AL=.015 | 1000 | AL=15 | 0 | Corrosion of household plumbing systems; Erosion of natural deposits. | Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. |

| 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 |
|---|---|---|---|---|---|---|
| Mercury [inorganic] (ppb) | .002 | 1000 | 2 | 2 | Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland. | Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage. |
| Nitrate (ppm) | 10 | | 10 | 10 | 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, if 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, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. |
| Selenium (ppb) | .05 | 1000 | 50 | 50 | Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines. | 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. |
| Thallium (ppb) | .002 | 1000 | 2 | 0.5 | Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories. | 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 herbicide used on row crops. | 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. |

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| 2,4,5-TP [Silvex](ppb) | .05 | 1000 | 50 | 50 | Residue of banned herbicide | 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 a 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 on row crops. | 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. |
| Atrazine (ppb) | .003 | 1000 | 3 | 3 | Runoff from herbicide used on row crops. | 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. |
| Carbofuran (ppb) | .04 | 1000 | 40 | 40 | Leaching of soil fumigant used on rice and alfalfa. | 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. |

| 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 |
|---|---|---|---|---|---|---|
| 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 changes. |
| Di(2-ethylhexyl) adipate (ppb). | .4 | 1000 | 400 | 400 | Discharge from chemical factories | Some people who drink water containing 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. |
| 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 MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer. |
| Dibromochloropropane (ppt). | .0002 | 1,000,000 | 200 | 0 | Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards. | Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive problems and may have an increased risk of getting cancer. |
| Dinoseb (ppb) | .007 | 1000 | 7 | 7 | Runoff from herbicide used on soybeans and vegetables. | 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; Discharge from chemical factories. | Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer. |

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| Endothall (ppb) | .1 | 1000 | 100 | 100 | Runoff from herbicide use | Some people who drink water containing endothall 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 an increased risk of getting cancer. |
| 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. |
| Heptachlor (ppt) | .0004 | 1,000,000 | 400 | 0 | Residue of banned pesticide | 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. |
| Heptachlor epoxide (ppt) | .0002 | 1,000,000 | 200 | 0 | Breakdown of heptachlor | 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. |

| 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 |
|---|---|---|---|---|---|---|
| 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 adverse reproductive effects, and may have an increased risk of getting cancer. |
| Hexachlorocyclopentadiene (ppb). | .05 | 1000 | 50 | 50 | Discharge from chemical factories | Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach. |
| Lindane (ppt) | .0002 | 1,000,000 | 200 | 200 | Runoff/leaching from insecticide used on cattle, lumber, gardens. | 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/leaching from insecticide used on apples, potatoes and tomatoes. | Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects. |
| PCBs [Polychlorinated biphenyls] (ppt). | .0005 | 1,000,000 | 500 | 0 | Runoff from landfills; Discharge of waste chemicals. | 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. |

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| Pentachlorophenol (ppb) | .001 | 1000 | 1 | 0 | Discharge from wood preserving factories. | Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer. |
| Picloram (ppb) | .5 | 1000 | 500 | 500 | Herbicide runoff | Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver. |
| Simazine (ppb) | .004 | 1000 | 4 | 4 | Herbicide runoff | Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood. |
| Toxaphene (ppb) | .003 | 1000 | 3 | 0 | Runoff/leaching from insecticide used on cotton and cattle. | 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. |
| Volatile organic contaminants: | | | | | | |
| 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 activities. | 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. |
| Chlorobenzene (ppb) | .1 | 1000 | 100 | 100 | Discharge from chemical and agricultural chemical factories. | 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. |

| 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 |
|---|---|---|---|---|---|---|
| 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 years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood. |
| 1,2-Dichloroethane (ppb) | .005 | 1000 | 5 | 0 | Discharge from industrial chemical factories. | 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 many years could experience problems with their liver. |
| trans-1,2-Dichloroethylene (ppb). | .1 | 1000 | 100 | 100 | Discharge from industrial chemical factories. | 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 an 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 many years may have an increased risk of getting cancer. |
| Ethylbenzene (ppb) | .7 | 1000 | 700 | 700 | Discharge from petroleum refineries. | Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys. |

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| 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 landfills. | 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. |
| Tetrachloroethylene (ppb) | .005 | 1000 | 5 | 0 | Discharge from factories and dry cleaners. | 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 well in excess of the MCL over many years could experience changes in their 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 experience problems with their liver, nervous system, or circulatory system. |
| 1,1,2-Trichloroethane (ppb). | .005 | 1000 | 5 | 3 | Discharge from industrial chemical factories. | 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. |

| 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 |
|---|---|---|---|---|---|---|
| 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 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. |
| Toluene (ppm) | 1 | | 1 | 1 | Discharge from petroleum factories. | 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 factories; Discharge from chemical factories. | Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system. |

[1] These arsenic values are effective January 23, 2006. Until then, the MCL is 0.05 mg/L and there is no MCLG.

*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

[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]

## 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 ≥0.064 mg/L or an HAA5 annual average ≥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 CT99.9 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 ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow.

(B) Determine successive $CTcalc/CT_{99.9}$ 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 ($CTcalc/CT_{99.9}$) for each sequence and then adding the ($CTcalc/CT_{99.9}$) values together to determine ($\Sigma$ ($CTcalc/CT_{99.9}$)).

(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 ($CTcalc/CT_{99.9}$) value of each segment and ($\Sigma(CTcalc/CT_{99.9})$) 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.

TABLE 1 TO § 141.201—VIOLATION CATEGORIES AND OTHER SITUATIONS REQUIRING A PUBLIC NOTICE—Continued

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|---|
| (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. |

(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

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|---|
| (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, in accordance with the requirements under § 141.31(d).

### § 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

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| (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)); |
| (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; |

TABLE 1 TO § 141.202—VIOLATION CATEGORIES AND OTHER SITUATIONS REQUIRING A TIER 1 PUBLIC NOTICE—Continued

(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) 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.

(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;

(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]

### § 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.

(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 violation under the Total Coliform Rule 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]

### § 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

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| (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; and |
| (5) Exceedance of the fluoride secondary maximum contaminant level (SMCL), as required under § 141.208. |

(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]

### § 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[1]

| Contaminant | MCL/MRDL/TT violations [2] | | Monitoring & testing procedure violations | |
|---|---|---|---|---|
| | Tier of public notice required | Citation | Tier of public notice required | Citation |
| I. Violations of National Primary Drinking Water Regulations (NPDWR): [3] | | | | |
| A. Microbiological Contaminants | | | | |
| 1. Total coliform | 2 | 141.63(a) | 3 | 141.21(a)–(e) |
| 2. Fecal coliform/E. coli | 1 | 141.63(b) | [4] 1, 3 | 141.21(e) |
| 3. Turbidity MCL | 2 | 141.13(a) | 3 | 141.22 |
| 4. Turbidity MCL (average of 2 days' samples >5 NTU) | [5] 2, 1 | 141.13(b) | 3 | 141.22 |
| 5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level) | [6] 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) | [7] 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 | [22] 2, 3 | 141.701–141.705 and 141.708–141.709. |
| B. Inorganic Chemicals (IOCs) | | | | |
| 1. Antimony | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 2. Arsenic | 2 | [8] 141.62(b) | 3 | [11] 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) | [12] 1, 3 | 141.23(a), (d), 141.23(f)(2) |
| 12. Nitrite | 1 | 141.62(b) | [12] 1, 3 | 141.23(a), (e), 141.23(f)(2) |
| 13. Total Nitrate and Nitrite | 1 | 141.62(b) | 3 | 141.23(a) |

| Contaminant | MCL/MRDL/TT violations [2] | | Monitoring & testing procedure violations | |
|---|---|---|---|---|
| | Tier of public notice required | Citation | Tier of public notice required | Citation |
| 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 | 141.80–141.85 | 3 | 141.86–141.89 |
| 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) |
| 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) |
| 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) |
| 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)<br>141.26(b) |
| 2. Alpha emitters | 2 | 141.66(c) | 3 | 141.25(a)<br>141.26(a) |
| 3. Combined radium (226 and 228) | 2 | 141.66(b) | 3 | 141.25(a)<br>141.26(a) |
| 4. Uranium | [9] 2 | 141.66(e) | [10] 3 | 141.25(a)<br>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 for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs). [13] | | | | |
| 1. Total trihalomethanes (TTHMs) | 2 | [14] 141.64(b) | 3 | 141.132(a)–(b),<br>141.600–141.605,<br>141.620–141.629 |
| 2. Haloacetic Acids (HAA5) | 2 | 141.64(b) | 3 | 141.132(a)–(b),<br>141.600–141.605,<br>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),<br>141.133(c)(3) | 2 [15], 3 | 141.132(a), (c),<br>141.133(c)(2) |
| 8. Chlorine dioxide (MRDL), where sample(s) in distribution system the next day are also above MRDL | [16] 1 | 141.65(a),<br>141.133(c)(3) | 1 | 141.132(a), (c),<br>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–<br>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 |

| Contaminant | MCL/MRDL/TT violations [2] | | Monitoring & testing procedure violations | |
|---|---|---|---|---|
| | Tier of public notice required | Citation | Tier of public notice required | Citation |
| II. Unregulated Contaminant Monitoring: [17] | | | | |
| 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 | [18] 1415, 1416, | N/A | N/A |
| B. Violation of conditions of a variance or exemption | 2 | 1415, 1416, [19] 142.307 | N/A | N/A |
| 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 [20] | 1 | N/A | N/A | N/A |
| F. Other situations as determined by primacy agency | [21] 1, 2, 3 | N/A | N/A | N/A |

APPENDIX A—ENDNOTES

1. Violations and other situations not listed in this table (e.g., failure to prepare Consumer Confidence Reports), do not require notice, unless otherwise determined by the primary 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).

2. MCL—Maximum contaminant level, MRDL—Maximum residual disinfectant level, TT—Treatment technique

3. The term Violations of National Primary Drinking Water Regulations (NPDWR) is used here to include violations of MCL, MRDL, treatment technique, monitoring, and testing procedure requirements.

4. Failure to test for fecal coliform or E. coli is a Tier 1 violation if testing is not done after any repeat sample tests positive for coliform. All other total coliform monitoring and testing procedure violations are Tier 3.

5. Systems that violate the turbidity MCL of 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 supercede 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 ≥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.

[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]

## APPENDIX B TO SUBPART Q OF PART 141—STANDARD HEALTH EFFECTS LANGUAGE FOR PUBLIC NOTIFICATION

| Contaminant | MCLG [1] mg/L | MCL [2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| National Primary Drinking Water Regulations (NPDWR)<br>A. Microbiological Contaminants | | | |
| 1a. Total coliform | Zero | See footnote [3] | Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. |
| 1b. Fecal coliform/E. coli | Zero | Zero | Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. |
| 2a. Turbidity (MCL) [4] | None | 1 NTU [5]/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) [6] | None | TT [7] | Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches. |
| 2c. Turbidity (IESWTR TT and LT1ESWTR TT) [8] | 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 | | | |
| 3. Giardia lamblia (SWTR/IESWTR/LT1ESWTR)<br>4. Viruses (SWTR/IESWTR/LT1ESWTR).<br>5. Heterotrophic plate count (HPC) bacteria [9] (SWTR/IESWTR/LT1ESWTR).<br>6. Legionella (SWTR/IESWTR/LT1ESWTR).<br>7. Cryptosporidium (IESWTR/FBRR/LT1ESWTR). | Zero | TT [10] | Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches. |
| 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 [11] | 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 [12] | 7 MFL | Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps. |
| 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. |

| Contaminant | MCLG [1] mg/L | MCL [2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 12. Beryllium | 0.004 | 0.004 | Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions. |
| 13. Cadmium | 0.005 | 0.005 | Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage. |
| 14. Chromium (total) | 0.1 | 0.1 | Some people who 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 excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. |
| 21. Selenium | 0.05 | 0.05 | Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation. |
| 22. Thallium | 0.0005 | 0.002 | Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver. |
| D. Lead and Copper Rule | | | |
| 23. Lead | Zero | TT [13] | Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. |
| 24. Copper | 1.3 | TT [14] | Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor. |
| E. Synthetic Organic 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) adipate | 0.4 | 0.4 | Some people who drink water containing 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 | $3\times10^{-8}$ | 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 increased risk of getting cancer. |
| 42. Glyphosate | 0.7 | 0.7 | Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties. |
| 43. Heptachlor | Zero | 0.0004 | Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer. |
| 44. Heptachlor epoxide | Zero | 0.0002 | Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer. |
| 45. Hexachlorobenzene | Zero | 0.001 | Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer. |
| 46. Hexachlorocyclo-pentadiene | 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. |

| Contaminant | MCLG [1] mg/L | MCL [2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 47. Lindane | 0.0002 | 0.0002 | Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver. |
| 48. Methoxychlor | 0.04 | 0.04 | Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties. |
| 49. Oxamyl (Vydate) | 0.2 | 0.2 | Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects. |
| 50. Pentachlorophenol | Zero | 0.001 | Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer. |
| 51. Picloram | 0.5 | 0.5 | Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver. |
| 52. Polychlorinated biphenyls (PCBs) | Zero | 0.0005 | Some people who drink water containing PCBs in excess of 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. |
| F. Volatile Organic Chemicals (VOCs) | | | |
| 55. Benzene | Zero | 0.005 | Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer. |
| 56. Carbon tetrachloride | Zero | 0.005 | Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer. |
| 57. Chlorobenzene (monochloro- benzene) | 0.1 | 0.1 | Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys. |
| 58. *o*-Dichlorobenzene | 0.6 | 0.6 | Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems. |
| 59. *p*-Dichlorobenzene | 0.075 | 0.075 | Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood. |
| 60. 1,2-Dichloroethane | Zero | 0.005 | Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer. |
| 61. 1,1-Dichloroethylene | 0.007 | 0.007 | Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver. |
| 62. *cis*-1,2-Dichloroethylene | 0.07 | 0.07 | Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver. |
| 63. *trans*-1,2-Dichloroethylene | 0.1 | 0.1 | Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver. |
| 64. Dichloromethane | Zero | 0.005 | Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer. |
| 65. 1,2-Dichloropropane | Zero | 0.005 | Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer. |

| | | | |
|---|---|---|---|
| 66. Ethylbenzene | 0.7 | 0.7 | Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys. |
| 67. Styrene | 0.1 | 0.1 | Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system. |
| 68. Tetrachloroethylene | Zero | 0.005 | Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer. |
| 69. Toluene | 1 | 1 | Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver. |
| 70. 1,2,4-Trichlorobenzene | 0.07 | 0.07 | Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands. |
| 71. 1,1,1-Trichloroethane | 0.2 | 0.2 | Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system. |
| 72. 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. |
| 73. Trichloroethylene | Zero | 0.005 | Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer. |
| 74. Vinyl chloride | Zero | 0.002 | Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer. |
| 75. Xylenes (total) | 10 | 10 | Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system. |
| G. Radioactive Contaminants | | | |
| 76. Beta/photon emitters | Zero | 4 mrem/yr [15] | Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer. |
| 77. Alpha emitters | Zero | 17 pCi/L [17] | Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer. |
| 78. Combined radium (226 & 228) | Zero | 5 pCi/L | Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer. |
| 79. Uranium [16] | Zero | 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) [18] | | | |
| 80. Total trihalomethanes (TTHMs) | N/A | 0.080 [19,20] | Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer. |
| 81. Haloacetic Acids (HAA) | N/A | 0.060 [21] | Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer. |
| 82. Bromate | Zero | 0.010 | Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer. |

| Contaminant | MCLG [1] mg/L | MCL [2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 83. Chlorite | 0.08 | 1.0 | Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia. |
| 84. Chlorine | 4 (MRDLG) [22] | 4.0 (MRDL) [23] | Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort. |
| 85. Chloramines | 4 (MRDLG) | 4.0 (MRDL) | Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia. |
| 86a. Chlorine dioxide, where any 2 consecutive daily samples taken at the entrance to the distribution system are above the MRDL. | 0.8 (MRDLG) | 0.8 (MRDL) | Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.<br>*Add for public notification only:* The chlorine dioxide violations reported today are the result of exceedances at the treatment facility only, not within the distribution system which delivers water to consumers. Continued compliance with chlorine dioxide levels within the distribution system minimizes the potential risk of these violations to consumers. |
| 86b. Chlorine dioxide, where one or more distribution system samples are above the MRDL. | 0.8 (MRDLG) | 0.8 (MRDL) | Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.<br>*Add for public notification only:* The chlorine dioxide violations reported today include exceedances of the EPA standard within the distribution system which delivers water to consumers. Violations of the chlorine dioxide standard within the distribution system may harm human health based on short-term exposures. Certain groups, including fetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure. |
| 87. Control of DBP precursors (TOC) | None | TT | Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer. |
| I. Other Treatment Techniques | | | |
| 88. Acrylamide | Zero | TT | Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer. |
| 89. Epichlorohydrin | Zero | TT | Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer. |

APPENDIX B—ENDNOTES

1. MCLG—Maximum contaminant level goal

2. MCL—Maximum contaminant level

3. For water systems analyzing at least 40 samples per month, no more than 5.0 percent of the monthly samples may be positive for total coliforms. For systems analyzing fewer than 40 samples per month, no more than one sample per month may be positive for total coliforms.

4. There are various regulations that set turbidity standards for different types of systems, including 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 = 0.015 mg/L

14. Action Level = 1.3 mg/L

15. Millirems per years

16. The uranium MCL is effective December 8, 2003 for all community water systems.

17. Picocuries per liter

18. Surface water systems and ground water systems under the direct influence of surface water are regulated under subpart H of 40 CFR 141. Subpart H community and non-transient non-community systems serving ≥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 ≥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]

### 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
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
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

## Subparts R–S [Reserved]

## 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 ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow or<br>(2) Successive $CTcalc/CT_{99.9}$ 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, your system must calculate the total inactivation ratio by determining ($CTcalc/CT_{99.9}$) for each sequence and then adding the ($CTcalc/CT_{99.9}$) values together to determine ($\Sigma CTcalc/CT_{99.9}$). |
| (b) Uses more than one point of disinfectant application before the first customer. | The ($CTcalc/CT_{99.9}$) 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 *Giardia lamblia* inactivation for each calendar month by dividing the sum of all *Giardia lamblia* 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'' Filtration ..... | A value determined by the State (not to exceed 1 NTU) based on the 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 consecutive recordings 15 minutes apart. | 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 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 ..... (§§ 141.530–141.536) | (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 forgo profiling) or that your system has begun disinfection profiling. | (i) For systems serving 500–9,999 by July 1, 2003; (ii) For systems serving fewer 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 Giardia lamblia (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 [1] or 40/30 certification [2] 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 [3] |
|---|---|---|---|
| **Systems that are not part of a combined distribution system and systems that serve the largest population in the combined distribution system** | | | |
| (i) ≥100,000 | October 1, 2006 | September 30, 2008 | January 1, 2009. |
| (ii) 50,000–99,999 | April 1, 2007 | March 31, 2009 | July 1, 2009. |
| (iii) 10,000–49,999. | October 1, 2007 | September 30, 2009 | January 1, 2010. |
| (iv) <10,000 (CWS Only). | April 1, 2008 | March 31, 2010 | July 1, 2010. |
| **Other systems that are part of a combined distribution system** | | | |
| (v) Wholesale system or consecutive system. | —at the same time as the system with the earliest compliance date in the combined distribution system. | —at the same time as the system with the earliest compliance date in the combined distribution system. | —at the same time as the system with the earliest compliance date in the combined distribution system. |

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

[2] You must submit your 40/30 certification under § 141.603 by the date indicated.

[3] If, within three months after the date identified in this column (nine months after the date identified in this column if you must comply on the schedule in paragraph (c)(1)(iii) 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 [1] | | | | |
|---|---|---|---|---|---|---|---|
| | | | Total per monitoring period | Near entry points | Average residence time | High TTHM locations | High HAA5 locations |
| Subpart H | | | | | | | |
| | <500 consecutive systems. | one (during peak historical month) [2]. | 2 | 1 | ..... | 1 | |
| | <500 non-consecutive systems. | ..... | 2 | ..... | ..... | 1 | 1 |
| | 500–3,300 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) [2]. | 2 | 1 | ..... | 1 | |
| | <500 non-consecutive systems. | ..... | 2 | ..... | ..... | 1 | 1 |
| | 500–9,999 ..... | four (every 90 days) ..... | 2 | ..... | ..... | 1 | 1 |
| | 10,000–99,999 ..... | ..... | 6 | 1 | 1 | 2 | 2 |
| | 100,000–499,999 ..... | ..... | 8 | 1 | 1 | 3 | 3 |
| | ≥500,000 ..... | ..... | 12 | 2 | 2 | 4 | 4 |

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

(2) You must take samples at locations other than the existing 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 [1] |
|---|---|
| (1) October 1, 2006 | January 2004. |
| (2) April 1, 2007 ..... | January 2004. |
| (3) October 1, 2007 | January 2005. |
| (4) April 1, 2008 ..... | January 2005. |

[1] Unless you are on reduced monitoring under 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 [1] | Distribution system monitoring location | | | |
|---|---|---|---|---|---|---|
| | | | Total per monitoring period [2] | Highest TTHM locations | Highest HAA5 locations | Existing subpart L compliance locations |
| Subpart H: | | | | | | |
| | <500 | per year | 2 | 1 | 1 | ..... |
| | 500–3,300 | per quarter | 2 | 1 | 1 | |
| | 3,301–9,999 | per quarter | 2 | 1 | 1 | ..... |
| | 10,000–49,999 | per quarter | 4 | 2 | 1 | 1 |
| | 50,000–249,999 | per quarter | 8 | 3 | 3 | 2 |
| | 250,000–999,999 | per quarter | 12 | 5 | 4 | 3 |
| | 1,000,000–4,999,999 | per quarter | 16 | 6 | 6 | 4 |
| | ≥5,000,000 | per quarter | 20 | 8 | 7 | 5 |
| Ground water: | | | | | | |
| | <500 | per year | 2 | 1 | 1 | |
| | 500–9,999 | per year | 2 | 1 | 1 | |
| | 10,000–99,999 | per quarter | 4 | 2 | 1 | 1 |
| | 100,000–499,999 | per quarter | 6 | 3 | 2 | 1 |
| | ≥500,000 | per quarter | 8 | 3 | 3 | 2 |

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

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

(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.

## 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: [1] |
|---|---|
| **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. |

| If you are this type of system | You must comply with subpart V monitoring by: [1] |
|---|---|
| (4) System serving < 10,000 | October 1, 2013 if no *Cryptosporidium* monitoring is required under § 141.701(a)(4) or<br>October 1, 2014 if *Cryptosporidium* 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. |

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

(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 [1] | Distribution system monitoring location total per monitoring period [2] |
|---|---|---|---|
| Subpart H: | | | |
| | <500 | per year | 2 |
| | 500–3,300 | per quarter | 2 |
| | 3,301–9,999 | per quarter | 2 |
| | 10,000–49,999 | per quarter | 4 |
| | 50,000–249,999 | per quarter | 8 |
| | 250,000–999,999 | per quarter | 12 |
| | 1,000,000–4,999,999 | per quarter | 16 |
| | ≥ 5,000,000 | per quarter | 20 |
| Ground Water: | | | |
| | <500 | per year | 2 |
| | 500–9,999 | per year | 2 |
| | 10,000–99,999 | per quarter | 4 |
| | 100,000–499,999 | per quarter | 6 |
| | ≥ 500,000 | per quarter | 8 |

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

(3) If you are an undisinfected system that begins using a disinfectant other than UV light after the dates in 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.

### § 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 ≤0.040 mg/L for TTHM and ≤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 ≤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 [1] | Distribution system monitoring location per monitoring period |
|---|---|---|---|
| Subpart H: | | | |
| | <500 | ..... | monitoring may not be reduced. |
| | 500–3,300 | per year ..... | 1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter. |
| | 3,301–9,999 | per year ..... | 2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement. |
| | 10,000–49,999 | per quarter ..... | 2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs. |
| | 50,000–249,999 | per quarter ..... | 4 dual sample sets—at the locations with the two highest TTHM and two highest HAA5 LRAAs. |
| | 250,000–999,999 | per quarter ..... | 6 dual sample sets—at the locations with the three highest TTHM and three highest HAA5 LRAAs. |
| | 1,000,000–4,999,999 | per quarter ..... | 8 dual sample sets—at the locations with the four highest TTHM and four highest HAA5 LRAAs. |
| | ≥ 5,000,000 | per quarter ..... | 10 dual sample sets—at the locations with the five highest TTHM and five highest HAA5 LRAAs. |

| Source water type | Population size category | Monitoring frequency [1] | Distribution system monitoring location per monitoring period |
|---|---|---|---|
| Ground Water: | | | |
| | <500 | every third year | 1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter. |
| | 500–9,999 | per year | 1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter. |
| | 10,000–99,999 | per year | 2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement. |
| | 100,000–499,999 | per quarter | 2 dual sample sets; at the locations with the highest TTHM and highest HAA5 LRAAs. |
| | ≥ 500,000 | per quarter | 4 dual sample sets at the locations with the two highest TTHM and two highest HAA5 LRAAs. |

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

(b) You may remain on reduced monitoring as long as the TTHM LRAA ≤0.040 mg/L and the HAA5 LRAA ≤0.030 mg/L at each monitoring location (for systems with quarterly reduced monitoring) or each TTHM sample ≤0.060 mg/L and each HAA5 sample ≤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 ≤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 ≤0.060 mg/L for TTHM and ≤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 exceedences.

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

(ii) Your request to limit the scope of the evaluation does not extend the schedule in 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 *E. coli*[a]. | (i) October 1, 2008 | (ii) October 1, 2017. |
| (5) Fewer than 10,000 and monitor for *Cryptosporidium*[b]. | (i) April 1, 2010 | (ii) April 1, 2019. |

[a] Applies only to filtered systems.
[b] Applies to filtered systems that meet the conditions of paragraph (a)(4) 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. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods online from *http://www.epa.gov/safewater/disinfection/lt2* or from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave., NW, Washington, DC 20460 (Telephone: 800–426–4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202–566–2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: h*ttp://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.

(1) Systems must analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in 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*. Systems must use methods for enumeration of E. coli in source water approved in § 136.3(a) of this title.

(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).

**§ 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 ¼ 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.[1] |

[1] 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*.

(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 $CT_{99.9}$ 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 ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow.

(ii) Determine successive $CTcalc/CT_{99.9}$ 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 ($CTcalc/CT_{99.9}$) for each sequence and then adding the ($CTcalc/CT_{99.9}$) values together to determine ($\Sigma$ ($CTcalc/CT_{99.9}$)).

(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 ($CTcalc/CT_{99.9}$) value of each segment and ($\Sigma$ ($CTcalc/CT_{99.9}$)) 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 *Cryptosporidium* bin concentration of . . .[1] | The bin classification is . . . |
|---|---|---|
| . . . required to monitor for *Cryptosporidium* under § 141.701. | *Cryptosporidium* <0.075 oocyst/L | Bin 1. |
| | 0.075 oocysts/L ≤*Cryptosporidium* <1.0 oocysts/L. | Bin 2. |
| | 1.0 oocysts/L ≤*Cryptosporidium* <3.0 oocysts/L. | Bin 3. |
| | *Cryptosporidium* ≥3.0 oocysts/L | Bin 4. |

BIN CLASSIFICATION TABLE FOR FILTERED SYSTEMS—Continued

| For systems that are: | With a *Cryptosporidium* bin concentration of . . .[1] | The bin classification is . . . |
|---|---|---|
| . . . serving fewer than 10,000 people and NOT required to monitor for *Cryptosporidium* under § 141.701(a)(4). | NA | Bin 1. |

[1] 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 *Cryptosporidium* 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 | (1) |
| Bin 3 | 2-log treatment | 2.5-log treatment | 2-log treatment | (2) |
| Bin 4 | 2.5-log treatment | 3-log treatment | 2.5-log treatment | (3) |

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

(b)(1) Filtered systems must use one or more of the treatment and management options listed in § 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 Cryptosporidium treatment requirements no later than . . .[a] |
|---|---|
| (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. |

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

(d) If the bin classification for a filtered system changes following the second round of source water monitoring, as determined under § 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 | *Cryptosporidium* treatment credit with design and implementation criteria |
|---|---|
| **Source Protection and Management Toolbox Options** | |
| (1) Watershed control program ..... | 0.5-log credit for State-approved program comprising required elements, annual program status report to State, and regular watershed survey. Unfiltered systems are not eligible for credit. Specific criteria are in § 141.716(a). |

MICROBIAL TOOLBOX SUMMARY TABLE: OPTIONS, TREATMENT CREDITS AND CRITERIA—Continued

| Toolbox Option | *Cryptosporidium* treatment credit with design and implementation criteria |
|---|---|
| (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 basin with coagulation. | 0.5-log credit during any month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative State-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through basins. Specific criteria are in § 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 dioxide | Log credit based on measured CT in relation to CT table. Specific criteria in § 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: $\log_{10}$(monthly mean of daily influent turbidity) − $\log_{10}$(monthly mean of daily effluent turbidity).

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

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

(c) *Bank filtration.* Systems receive *Cryptosporidium* treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this 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:

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

Where:

LRV = log removal value demonstrated during challenge testing; $C_f$ = the feed concentration measured during the challenge test; and $C_p$ = the filtrate concentration measured during the challenge test. 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 ($LRV_{filter}$) must be assigned the value of the minimum LRV observed during the three challenge periods for that filter.

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

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

(b) *Membrane filtration*. (1) Systems receive *Cryptosporidium* treatment credit for membrane filtration that meets the criteria of this 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:

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

Where:

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

(vi) The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ($LRV_{C\text{-}Test}$). If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then $LRV_{C\text{-}Test}$ 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:

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

Where:

$LRV_{DIT}$ = the sensitivity of the direct integrity test; $Q_p$ = total design filtrate flow from the membrane unit; $Q_{breach}$ = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured, and VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

(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:

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

Where:

$LRV_{DIT}$ = the sensitivity of the direct integrity test; $C_f$ = the typical feed concentration of the marker used in the test; and $C_p$ = the filtrate concentration of the marker from an integral membrane unit.

(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 [1]

| 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 |

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

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

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

| 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 |

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

(c) *Site-specific study*. The State may approve 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 | *Cryptosporidium* UV dose (mJ/cm$^2$) | *Giardia lamblia* UV dose (mJ/cm$^2$) | Virus UV dose (mJ/cm$^2$) |
|---|---|---|---|
| (i) 0.5 | 1.6 | 1.5 | 39 |
| (ii) 1.0 | 2.5 | 2.1 | 58 |
| (iii) 1.5 | 3.9 | 3.0 | 79 |
| (iv) 2.0 | 5.8 | 5.2 | 100 |
| (v) 2.5 | 8.5 | 7.7 | 121 |
| (vi) 3.0 | 12 | 11 | 143 |
| (vii) 3.5 | 15 | 15 | 163 |
| (viii) 4.0 | 22 | 22 | 186 |

(2) *Reactor validation testing*. Systems must use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in 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 online 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 |
| | (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. |

MICROBIAL TOOLBOX REPORTING REQUIREMENTS—Continued

| Toolbox option | Systems must submit the following information | On the following schedule |
|---|---|---|
| (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). | No later than the applicable treatment compliance date in § 141.713. |
| | (ii) If monthly average of daily max turbidity is greater than 1 NTU then system must report result and submit an assessment of the cause.. | Report within 30 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 141.713. |
| (6) Combined filter performance | Monthly verification of combined filter effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the 4 hour CFE measurements taken each month. | Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 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. | No later than the applicable treatment compliance date in § 141.713. |
| | (ii) As required by the State, monthly verification of operation within conditions of State approval for demonstration of performance credit. | 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. | No later than the applicable treatment compliance date in § 141.713. |
| | (ii) Monthly verification that 100% of plant flow was filtered. | 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. | No later than the applicable treatment compliance date in § 141.713. |
| | (ii) Monthly report summarizing the following: (A) All direct integrity tests above the control limit; (B) If applicable, any turbidity or alternative state-approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken. | Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 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. |

MICROBIAL TOOLBOX REPORTING REQUIREMENTS—Continued

| Toolbox option | Systems must submit the following information | On the following schedule |
|---|---|---|
| (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.<br>(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).. | No later than the applicable treatment compliance date in § 141.713.<br>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.