ARC 3568C

ENVIRONMENTAL PROTECTION COMMISSION[567]

Notice of Intended Action

Proposing rule making related to water supply and providing an opportunity for public comment

The Environmental Protection Commission hereby proposes to amend Chapter 40, "Scope of Division—Definitions—Forms—Rules of Practice," Chapter 41, "Water Supplies," Chapter 42, "Public Notification, Public Education, Consumer Confidence Reports, Reporting, and Record Maintenance," Chapter 43, "Water Supplies—Design and Operation," Chapter 44, "Drinking Water State Revolving Fund," Chapter 81, "Operator Certification: Public Water Supply Systems and Wastewater Treatment Systems," and Chapter 83, "Laboratory Certification," Iowa Administrative Code.

Legal Authority for Rule Making

This rule making is proposed under the authority provided in Iowa Code chapter 272C and sections 455B.105, 455B.113, 455B.173, 455B.222 and 455B.299.

State or Federal Law Implemented

This rule making implements, in whole or in part, Iowa Code chapter 272C and sections 17A.3(1)"b," 455B.113 to 455B.115, 455B.171 to 455B.188, 455B.190 to 455B.192, 455B.211 to 455B.224 and 455B.299.

Purpose and Summary

The purpose of the proposed rule making is to adopt the federal Groundwater Rule (GWR, November 2006), Lead and Copper Rule – Short-Term Revisions (LCR-STR, October 2007), and Revised Total Coliform Rule (RTCR, February 2013). The U.S. Environmental Protection Agency (EPA) also made other changes to existing federal drinking water rules between August 2004 and July 2016, primarily in analytical methods, which are included in this rule making. States are expected to incorporate these federal rule provisions into state program rules in order to maintain primacy in the drinking water program. The proposed amendments, if adopted, will accomplish that end. In addition, other changes to the Department's public drinking water, operator certification, and environmental laboratory rules are proposed.

Proposed changes are summarized below by chapter.

- Chapter 40: amend definitions for "sanitary survey" and "Ten States Standards"; add new definitions for the following: clean compliance history, Level 1 assessment, Level 2 assessment, sanitary defect, and seasonal system; include the Department's website address; and update forms.
- Chapter 41: rescind the existing total coliform rule and replace it with the RTCR; update analytical methods; revise the existing lead and copper rule by adopting the LCR-STR; require use of an analytical method for an organic contaminant that meets the method detection limit requirements for compliance samples; include the GWR; and make other minor corrections.
- Chapter 42: include the public notification, consumer confidence report, lead consumer notice, and lead public education requirements for the GWR, LCR-STR, and RTCR; update the Department's environmental emergency reporting hotline telephone number; update the American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) 60 certification requirement to allow for use of chemicals that are accredited via third-party conformance with the standard; allow noncommunity systems that only use a cation-exchange softener to have bacterial compliance history reviewed before continuous disinfection is required; require all systems using water to which chlorine has been added to monitor daily in the distribution system to ensure the minimum disinfectant residual concentration is met; require inactivation ratio to be calculated each day the surface water or influenced groundwater

treatment plant is in operation and to notify the Department within 24 hours if the ratio is below 1.0; and make other minor corrections.

- Chapter 43: include the provisions for the GWR, LCR-STR, and RTCR; update the construction standards to the 2012 edition of Ten States Standards and 2016 American Water Works Standards; require new groundwater sources to be tested for ammonia; add the separation distances for ground heat exchange (GHEX) loop boreholes; update the ANSI/NSF 61 certification requirement to allow for use of drinking water system components that are accredited via third-party conformance with the standard; remove arsenic as an exception from the best available technology listing for inorganic compounds; require at least 0.5 log inactivation of *Giardia lamblia* cysts in treatment of surface or influenced groundwater sources to be from a chemical disinfectant; require notification by the surface water or influenced groundwater system to the Department within 24 hours if the daily total inactivation ratio is below 1.0; add the calibration and verification requirements for turbidity and residual disinfectant monitoring; update analytical methods; include federal language for the Long-Term 2 Enhanced Surface Water Treatment Rule for sample collection, analytical methods, and bank filtration credit; add CT virus inactivation tables for groundwater systems; and make other minor changes.
- Chapter 44: revise the provision relating to allowable costs to be funded through the Drinking Water State Revolving Fund to allow for funding of the replacement of lead service lines.
- Chapter 81: add new definitions of "operation shift" and "shift operator"; correct Iowa Code citations in the definition of "rural water district"; allow transient noncommunity systems to be classified as Grade A systems; rescind sunset education credit; rescind oral examination allowance and fee; change reexamination time frame from 180 days to 30 days; remove the description of accommodations for examination; rescind temporary certification; and make other minor changes.
- Chapter 83: update the "Manual for Certification of Laboratories Analyzing Environmental Samples for the Iowa DNR" to 2017; remove reference to "fecal coliform" and replace with reference to *E. coli* when appropriate; rescind an outdated procedure for initial certification of solid waste and contaminated sites program parameters; update the Department's environmental emergency hotline telephone number; add credit card fee payment option; include record-keeping requirements for a laboratory auditor; and make other minor changes.

These chapters and the amendments to them were reviewed by the water supply technical advisory group at a meeting held on April 28, 2017. The group is comprised of individuals representing a wide variety of water supply stakeholders, including professional drinking water organizations, certified operators, certified environmental laboratories, environmental interests, agricultural and business interests, public water supplies, consulting engineers, and other state agencies.

Fiscal Impact

This rule making has no fiscal impact to the State of Iowa.

Jobs Impact

After analysis and review of this rule making, no impact on jobs has been found.

Waivers

There are no specific provisions for waivers in the rules, although there are considerations for system source water, size, and type in GWR and RTCR. There are general authorities to issue waivers for some rules, which are used when appropriate. Any person who believes that the application of the discretionary provisions of this rule making would result in hardship or injustice to that person may petition the Department for a waiver of the discretionary provisions, if any.

Public Comment

Any interested person may submit written or oral comments concerning this proposed rule making. Written or oral comments in response to this rule making must be received by the Department no later than 4:30 p.m. on February 9, 2018. Comments should be directed to:

Diane Moles
Department of Natural Resources
Wallace State Office Building
502 East 9th Street
Des Moines, Iowa 50319
Email: diane.moles@dnr.iowa.gov
Phone: 515.725.0281

Public Hearing

A public hearing at which persons may present their views orally or in writing will be held as follows. Upon arrival, attendees should proceed to the fourth floor to check in at the Department's reception desk to receive a visitor's badge and directions to the appropriate hearing location.

February 8, 2018, at 10 a.m.
DNR Conference Room 2 North
Wallace State Office Building
Des Moines, Iowa

Persons who wish to make oral comments at the public hearing may be asked to state their names for the record and to confine their remarks to the subject of this proposed rule making.

Any persons who intend to attend the public hearing and have special requirements, such as those related to hearing or mobility impairments, should contact the Department and advise of specific needs.

Review by Administrative Rules Review Committee

The Administrative Rules Review Committee, a bipartisan legislative committee which oversees rule making by executive branch agencies, may, on its own motion or on written request by any individual or group, review this rule making at its regular monthly meeting or at a special meeting. The Committee's meetings are open to the public, and interested persons may be heard as provided in Iowa Code section 17A.8(6).

The following rule-making actions are proposed:

ITEM 1. Amend rule **567—40.2(455B)**, definitions of "Sanitary survey" and "Ten States Standards," as follows:

"Sanitary survey" means a review and on-site inspection conducted by the department of the water source, facilities, equipment, operation and maintenance and records of a public water supply system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water and identifying improvements necessary to maintain or improve drinking water quality, pursuant to 567—subrule 43.1(7).

"Ten States Standards" means the "Recommended Standards for Water Works," ~~2007~~ 2012 edition as adopted by the Great Lakes—Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers.

ITEM 2. Adopt the following **new** definitions of "Clean compliance history," "Level 1 assessment," "Level 2 assessment," "Sanitary defect" and "Seasonal system" in rule **567—40.2(455B)**:

"Clean compliance history" means, for the purposes of 567—paragraph 41.2(1)*"e"*(4)"2," a record of no monitoring violations and no coliform treatment technique trigger exceedances or treatment technique violations under 567—subrule 41.2(1).

"Level 1 assessment" means an evaluation to identify the possible presence of sanitary defects, defects in distribution system coliform bacteria monitoring practices, and (when possible) the likely reason that the system triggered the assessment. A Level 1 assessment is conducted by the system operator or owner. Minimum elements of the assessment include review and identification of atypical events that could affect distributed water quality or indicate that distributed water quality was impaired; changes in distribution system maintenance and operation that could affect distributed water quality (including water storage); source and treatment considerations that bear on distributed water quality, where appropriate (e.g., whether a groundwater system is disinfected); existing water quality monitoring data; and inadequacies in sample sites, sampling protocol, and sample processing. The system owner or operator must conduct the assessment consistent with any department directives that tailor specific assessment elements with respect to the size and type of the system and the size, type, and characteristics of the distribution system.

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

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

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

ITEM 3. Amend rule 567—40.3(17A,455B), introductory paragraph, as follows:

567—40.3(17A,455B) Forms. The following forms are used by the public to apply for department approvals and to report on activities related to the public water supply program of the department. All forms may be obtained from the department's website at www.iowadnr.gov (water supply pages) or from the Environmental Services Division, Administrative Support Station, Department of Natural Resources, Henry A. Wallace Building, 502 East Ninth Street, Des Moines, Iowa 50319-0034. Properly completed application forms shall be submitted to the Water Supply Section, Environmental Services Division. Water Supply System Monthly and Other Operation Reporting forms shall be submitted to the appropriate field office (see 567—subrule 42.4(3)). Properly completed laboratory forms (reference 567—Chapter 83) shall be submitted to the State Hygienic Laboratory or as otherwise designated by the department.

ITEM 4. Amend the following two entries in the table in subrule **40.3(1)**:

Schedule No.	Name of Form	Form Number
~~"6b"~~	~~Distribution Pumping Station~~	~~542-3141~~
"13a"	Chemical Addition	~~542-3141~~ 542-3241

ITEM 5. Amend subrule 40.3(2) as follows:

40.3(2) *Operation permit application forms.*

~~*a.* Form 13-1 — community water supply~~

~~*b.*~~ *a.* Form 13-2 — ~~noncommunity~~ application for a new water supply 542-1300

b. Form 13-3 — renewal application for an existing water supply 542-1301

ITEM 6. Rescind subrule 40.3(3) and adopt the following **new** subrule in lieu thereof:

40.3(3) *Water supply reporting forms.* The monthly water supply operation report forms are available from the department's water supply operations section website. The laboratory analyses for compliance samples are reported via electronic means directly to the department by each certified laboratory.

ITEM 7. Amend rule 567—41.2(455B), catchwords, as follows:

567—41.2(455B) Biological maximum contaminant ~~levels~~ level (MCL), treatment technique (TT), and monitoring requirements.

ITEM 8. Rescind subrule 41.2(1) and adopt the following **new** subrule in lieu thereof:

41.2(1) *Coliform bacteria and E. coli.* The provisions of this subrule include both maximum contaminant level and treatment technique requirements. The provisions of this subrule apply to all public water systems. Failure to comply with the applicable requirements in this subrule is a violation of the national primary drinking water regulations.

a. Maximum contaminant level. A public water system must determine compliance with the MCL for *E. coli* for each month in which the system is required to monitor for total coliforms. A system is in compliance with the MCL for *E. coli* for samples taken under this subrule unless any of the following conditions occur. For purposes of the public notification requirements in 567—42.1(455B), violation of the MCL may pose an acute risk to health.

(1) *E. coli*-positive repeat sample. The system has an *E. coli*-positive repeat sample following a total coliform-positive routine sample.

(2) *E. coli*-positive routine sample. The system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample.

(3) Failure to collect all required repeat samples following *E. coli*-positive routine samples. The system fails to take all required repeat samples following an *E. coli*-positive routine sample.

(4) Failure to test for *E. coli* on any total coliform-positive repeat sample. The system fails to test for *E. coli* when any repeat sample tests positive for total coliform.

b. Analytical methodology.

(1) Sample volume. The standard sample volume required for analysis is 100 mL, regardless of the analytical method used.

(2) Presence/absence required. Only the presence or absence of total coliforms and *E. coli* is required to be determined in any compliance sample; a determination of density is acceptable but is not required.

(3) Holding time and temperature. The time from sample collection to initiation of test medium incubation may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10° C during transit.

(4) Dechlorinating agent required for chlorinated water. If water having a residual chlorine (measured as free, combined, or total chlorine) is to be analyzed, sufficient sodium thiosulfate ($Na_2S_2O_3$) must be added to the sample bottle before sterilization to neutralize any residual chlorine in

the water sample. Dechlorination procedures are addressed in Section 9060A.2 of Standard Methods for the Examination of Water and Wastewater (20th and 21st editions).

(5) Systems must conduct total coliform and *E. coli* analyses in accordance with one of the analytical methods in the following table.

Methodology Category	Method[1]	Citation[1]
Total Coliform Bacteria Methods:		
Lactose Fermentation Methods	Standard Total Coliform Fermentation Technique	Standard Methods 9221 B.1, B.2 (20th, 21st, and 22nd ed.)[2, 3] Standard Methods Online 9221 B.1, B.2-99, B-06[2,3]
	Presence-Absence (P-A) Coliform Test	Standard Methods 9221 D.1, D.2 (20th and 21st ed.)[2, 7] Standard Methods Online 9221 D.1, D.2-99[2, 7]
Membrane Filtration Methods	Standard Total Coliform Membrane Filter Procedure	Standard Methods 9222 B, C (20th and 21st ed.)[2, 4] Standard Methods Online 9222 B-97[2, 4], 9222 C-97[2, 4]
	Membrane Filtration using MI Medium	EPA Method 1604[2]
	m-ColiBlue24 Test[2, 4]	
	Chromocult[2, 4]	
Enzyme Substrate Methods	Colilert	Standard Methods 9223 B (20th, 21st and 22nd ed.)[2, 5] Standard Methods Online 9223 B-97, B-04[2, 5]
	Colilert-18	Standard Methods 9223 B (21st and 22nd ed.)[2, 5] Standard Methods Online 9223 B-04[2, 5]
	Colisure	Standard Methods 9223 B (20th, 21st and 22nd ed.)[2, 5, 6] Standard Methods Online 9223 B-97, B-04[2, 5, 6]
	E*Colite Test[2]	
	Readycult Test[2]	
	modified Colitag Test[2]	
	Tecta EC/TC Test[2]	
***Escherichia coli (E. coli)* Methods:**		
Escherichia coli Procedures (following Lactose Fermentation Methods)	EC-MUG Medium	Standard Methods 9221 F.1 (20th, 21st and 22nd ed.)[2] Standard Methods Online 9221 F-06[2]
Escherichia coli Partition Method	EC broth with MUG (EC-MUG)	Standard Methods 9222 G.1*c*(2) (20th and 21st ed.)[2, 8]
	NA-MUG Medium	Standard Methods 9222 G.1*c*(1) (20th and 21st ed.)[2]
Membrane Filtration Methods	Membrane Filtration using MI Medium	EPA Method 1604[2]
	m-ColiBlue24 Test[2, 4]	
	Chromocult[2, 4]	
Enzyme Substrate Methods	Colilert	Standard Methods 9223 B (20th, 21st and 22nd ed.)[2, 5] Standard Methods Online 9223 B-97, B-04[2, 5, 6]
	Colilert-18	Standard Methods 9223 B (21st and 22nd ed.)[2, 5] Standard Methods Online 9223 B-04[2, 5]
	Colisure	Standard Methods 9223 B (20th, 21st and 22nd ed.)[2, 5, 6] Standard Methods Online 9223 B-97, 04[2, 5, 6]
	E*Colite Test[2]	
	Readycult Test[2]	
	modified Colitag Test[2]	
	Tecta EC/TC Test[2]	

[1]The procedures must be done in accordance with the documents listed in 41.2(1)*"a"*(6). For Standard Methods, either the 20th (1998) or 21st (2005) edition may be used. For Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions that may be used. For vendor methods, the date of the method listed in 41.2(1)*"a"*(6) is the date/version of the approved method. The methods listed are the only versions that may be used for compliance with this rule. Laboratories should be careful to use only the approved versions of the methods, as product package inserts may not be the same as the approved versions of the methods.

[2]Incorporated by reference. See 41.2(1)*"a"*(6).

[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 lactose broth and lauryl tryptose broth using the water normally tested and if the findings from this comparison demonstrate that the false-positive rate and the false-negative rate for total coliforms, using lactose broth, is less than 10 percent.

[4]All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series. Alternatively, membrane filtration equipment that is presterilized by the manufacturer (i.e., disposable funnel units) may be used.

[5]Multiple-tube and multi-well enumerative formats for this method are approved for use in presence-absence determination under this subrule.

[6]Colisure results may be read after an incubation time of 24 hours.

[7]A multiple-tube enumerative format, as described in Standard Methods for the Examination of Water and Wastewater 9221, is approved for this method for use in presence-absence determination under this subrule.

[8]The following changes must be made to the EC broth with MUG (EC-MUG) formulation: Potassium dihydrogen phosphate, KH_2PO_4, must be 1.5 g, and 4-methylumbelliferyl-beta-D-glucuronide must be 0.05 g.

(6) Methods incorporated by reference. The standards required in this subrule are incorporated by reference with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR Part 51. All approved material is available for inspection either electronically at www.regulations.gov, in hard copy at the Water Docket, or from the sources indicated below. The Docket ID is EPA-HQ-OW-2008-0878. Hard copies of these documents may be viewed at the Water Docket in the EPA Docket Center, (EPA/DC) EPA West, Room 3334, 1301 Constitution Avenue, NW, Washington, DC. The EPA Docket Center Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202)566-1744, and the telephone number for the Water Docket is (202)566-2426. Copyrighted materials are only available for viewing in hard copy. These documents are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202)741-6030 or go to www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

1. American Public Health Association, 800 I Street, NW, Washington, DC 20001. Standard Methods for the Examination of Water and Wastewater, 20th edition (1998):

- Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," B.1, B.2, "Standard Total Coliform Fermentation Technique."
- Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," D.1, D.2, "Presence-Absence (P-A) Coliform Test."
- Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," B, "Standard Total Coliform Membrane Filter Procedure."
- Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," C, "Delayed-Incubation Total Coliform Procedure."
- Standard Methods 9223, "Enzyme Substrate Coliform Test," B, "Enzyme Substrate Test," Colilert and Colisure.
- Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," F.1, "*Escherichia coli* Procedure: EC-MUG Medium."
- Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," G.1*c*(2), "*Escherichia coli* Partition Method: EC Broth with MUG (EC-MUG)."
- Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," G.1*c*(1), "*Escherichia coli* Partition Method: NA-MUG Medium."

2. American Public Health Association, 800 I Street, NW, Washington, DC 20001. Standard Methods for the Examination of Water and Wastewater, 21st edition (2005):

- Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," B.1, B.2, "Standard Total Coliform Fermentation Technique."
- Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," D.1, D.2, "Presence-Absence (P-A) Coliform Test."
- Standard Methods 9221, "Membrane Filter Technique for Members of the Coliform Group," B, "Standard Total Coliform Membrane Filter Procedure."
- Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," C, "Delayed-Incubation Total Coliform Procedure."
- Standard Methods 9223, "Enzyme Substrate Coliform Test," B, "Enzyme Substrate Test," Colilert and Colisure.
- Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," F.1, "*Escherichia coli* Procedure: EC-MUG Medium."
- Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," G.1.*c*(2), "*Escherichia coli* Partition Method: EC Broth with MUG (EC-MUG)."
- Standard Methods 9222, "Membrane Filter Technique for Members of the Coliform Group," G.1.*c*(1), "*Escherichia coli* Partition Method: NA-MUG Medium."

3. American Public Health Association, 800 I Street, NW, Washington, DC 20001. "Standard Methods Online" available at www.standardmethods.org:

- Standard Methods Online 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group" (1999), B.1, B.2-99, B-06, "Standard Total Coliform Fermentation Technique."
- Standard Methods Online 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group" (1999), D.1, D.2-99, "Presence-Absence (P-A) Coliform Test."
- Standard Methods Online 9222, "Membrane Filter Technique for Members of the Coliform Group" (1997), B-97, "Standard Total Coliform Membrane Filter Procedure."
- Standard Methods Online 9222, "Membrane Filter Technique for Members of the Coliform Group" (1997), B-97, "Delayed-Incubation Total Coliform Procedure."
- Standard Methods Online 9223, "Enzyme Substrate Coliform Test" (1997), B-97, "Enzyme Substrate Test," Colilert and Colisure.

4. Charm Sciences, Inc., 659 Andover Street, Lawrence, MA 01843-1032; telephone (800)343-2170: E*Colite—"Charm E*Colite Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Drinking Water," January 9, 1998.

5. CPI International, Inc., 5580 Skylane Blvd., Santa Rosa, CA 95403; telephone (800)878-7654: modified Colitag, ATP D05-0035—"Modified Colitag Test Method for the Simultaneous Detection of *E. coli* and other Total Coliforms in Water," August 28, 2009.

6. EMD Millipore (a division of Merck KGaA, Darmstadt, Germany), 290 Concord Road, Billerica, MA 01821; telephone (800)645-5476:

- Chromocult—"Chromocult Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and *Escherichia coli* for Finished Waters," November 2000, Version 1.0.
- Readycult—"Readycult Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters," January 2007, Version 1.1.

7. EPA's Water Resource Center (MC-4100T), 1200 Pennsylvania Avenue, NW, Washington, DC 20460; telephone (202)566-1729: EPA Method 1604, EPA 821-R-02-024—"EPA Method 1604: Total Coliforms and *Escherichia coli* in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium)," September 2002, www.nemi.gov.

8. Hach Company, P.O. Box 389, Loveland, CO 80539; telephone (800)604-3493: m-ColiBlue24—"Membrane Filtration Method m-ColiBlue24 Broth," Revision 2, August 17, 1999.

9. American Public Health Association, 800 I Street, NW, Washington, DC 20001. Standard Methods for the Examination of Water and Wastewater, 22nd edition (2012):

- Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," B.1, B.2, "Standard Total Coliform Fermentation Technique."
- Standard Methods 9223, "Enzyme Substrate Coliform Test," B, "Enzyme Substrate Test," Colilert and Colisure.
- Standard Methods 9221, "Multiple-Tube Fermentation Technique for Members of the Coliform Group," F.1, "*Escherichia coli* Procedure: EC-MUG Medium."

10. Veolia Water Solutions and Technologies, Suite 4697, Biosciences Complex, 116 Barrie Street, Kingston, Ontario, Canada K7L 3N6: Tecta EC/TC. "Presence/Absence Method for Simultaneous Detection of Total Coliforms and *Escherichia coli* in Drinking Water," April 2014.

(7) Laboratory certification. Systems must have all compliance samples required under this subrule analyzed by a laboratory certified by the department in accordance with 567—Chapter 83 to analyze drinking water samples. The laboratory used by the system must be certified for each method and associated contaminant used for compliance monitoring analyses under this subrule.

c. Sampling plan.

(1) Written sampling plan required. Systems must collect total coliform samples according to the written sampling plan.

1. Systems must develop a written sampling plan that identifies sample locations and a sample collection schedule that are representative of water throughout the distribution system. Major elements of the plan shall include, but not be limited to, the following:

- Map of the distribution system served by the system;
- List of routine compliance sample locations for each sample period;
- List of repeat compliance sample locations for each routine compliance sample location;
- Any other sample locations necessary to meet the requirements of this subrule;
- Sample collection schedule;
- Proper sampling technique instructions;
- Log of samples taken; and
- For groundwater systems subject to 567—41.7(455B), triggered source water monitoring plan.

2. The system shall review the sampling plan every two years and update it as needed and shall retain the sampling plan on file at the facility. The plan must be made available to the department upon request and for review during sanitary surveys and must be revised by the system at the direction of the department.

3. Monitoring under this subrule may take place at a customer's premises, dedicated sampling station, or other designated compliance sampling location.

(2) Sampling schedule. Systems must collect routine samples at regular time intervals throughout the month. Systems that use only groundwater and serve 4,900 or fewer people, or regional water systems that use only groundwater and serve less than 121 miles of pipe, may collect all required routine samples on a single day if the samples are taken from different sites.

(3) Minimum number of required routine samples. Systems must take at least the minimum number of required routine samples even if the system has had an *E. coli* MCL violation or has exceeded the coliform treatment technique triggers in 41.2(1)*"l."* Such samples must be designated as "routine" when submitted to the laboratory.

(4) Additional compliance monitoring samples. A system may conduct more compliance monitoring than is required to investigate potential problems in the distribution system and may use monitoring as a tool to assist in uncovering problems. A system may take more than the minimum number of required routine samples and must include the results when calculating whether the coliform treatment technique trigger in 41.2(1)*"l"*(1)"1" and "2" has been exceeded only if the samples are taken in accordance with the existing sampling plan and are representative of water throughout the distribution system. Such samples must be designated as "routine" when submitted to the laboratory.

(5) Repeat samples. Systems must identify repeat monitoring locations in the sampling plan. Repeat samples must be analyzed at the same laboratory as the corresponding original routine sample(s), unless written approval for use of a different laboratory is granted by the department. The system must collect at least one repeat sample from the sampling tap where the original routine total

coliform-positive sample was taken, at least one repeat sample at a tap within five service connections upstream of the original sample location, and at least one repeat sample at a tap within five service connections downstream of the original sample location. Such samples must be designated as "repeat" when submitted to the laboratory.

1. If the sampling location of a total coliform-positive sample is at or within one service connection from the end of the distribution system, the system must still take all required repeat samples. However, the department may allow an alternative sampling location in lieu of one of the upstream or downstream sampling locations.

2. A groundwater system with two or more wells that is required to conduct triggered source water monitoring under subrule 41.7(3) must collect groundwater source sample(s) in addition to the required repeat samples.

3. A groundwater system with a single well that is required to conduct triggered source water monitoring may, with written department approval, collect one of its required repeat samples at the triggered source water sample monitoring location. The system must demonstrate to the department's satisfaction that the sampling plan remains representative of water quality in the distribution system. If approved, the sample result may be used to meet the requirements of subrule 41.7(3) and this subrule. If a repeat sample taken at the triggered source water monitoring location is *E. coli*-positive, the system has violated the *E. coli* MCL, and must also comply with the requirements for additional source water samples under 41.7(3)*"a"*(3).

4. The department may review, revise, and approve, as appropriate, repeat sampling proposed by the system under 41.2(1)*"c"*(5). The system must demonstrate that the sampling plan remains representative of the water quality in the distribution system.

(6) Special purpose samples. Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, must not be used to determine whether the coliform treatment technique trigger has been exceeded. Repeat samples are not considered special purpose samples and must be used to determine whether the coliform treatment technique trigger has been exceeded. Such samples must be designated as "special" when submitted to the laboratory and cannot be used for compliance.

(7) Residual disinfectant measurement. Any system adding a chemical disinfectant to the water must meet the requirements specified in 567—subparagraph 42.4(3)*"b"*(1). The minimum required residual disinfectant measurements are as follows, unless otherwise directed by the department in writing:

1. Groundwater systems. A system that uses only groundwater and adds a chemical disinfectant or provides water that contains a disinfectant must measure and record the free and total chlorine residual disinfectant concentration at least at the same points in the distribution system and at the same time as routine and repeat total coliform bacteria samples are collected, as specified in 41.2(1)*"e"* through 41.2(1)*"j."* The system shall report the residual disinfectant concentration to the laboratory with the bacteria sample and comply with the applicable reporting requirements of 567—subrule 42.4(3).

2. Surface water and influenced groundwater systems.

- Any surface water or IGW PWS must meet the requirements for minimum residual disinfectant entering the distribution system pursuant to 567—paragraph 43.5(4)*"b"*(2)"1"; and
- A system that uses surface water or IGW must comply with the requirements specified in 567—paragraph 43.5(4)*"b"*(2)"2" for daily distribution system residual disinfectant monitoring. The system must measure and record the free and total chlorine residual disinfectant concentration at least at the same points in the distribution system and at the same time as routine and repeat total coliform bacteria samples are collected, as specified in 41.2(1)*"e"* through 41.2(1)*"j."* The residual disinfectant measurements required as a part of this subrule may be used to satisfy the requirement in 567—paragraph 43.5(4)*"b"*(2)"2" on the day(s) when a routine or repeat total coliform bacteria sample(s) is collected, in lieu of separate samples. The system shall report the residual disinfectant concentration to the laboratory with the bacteria sample and comply with the applicable reporting requirements of 567—subrule 42.4(3).

d. Invalidation of total coliform samples. A total coliform-positive sample invalidated under this paragraph does not count toward meeting the minimum monitoring requirements of this subrule.

(1) The department may invalidate a total coliform-positive sample only if the following conditions are met:

1. The laboratory establishes that improper sample analysis caused the total coliform-positive result.

2. The department, on the basis of the results of the required repeat samples, determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. "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. The department cannot invalidate a sample on the basis of repeat sample results unless all repeat samples collected at the same tap as the original total coliform-positive sample are also total coliform-positive and all repeat samples collected at a location other than the original tap are total coliform-negative. The department cannot invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative or if the system has only one service connection.

3. The department has substantial grounds to believe that the total coliform-positive result is due to a circumstance or condition that does not reflect water quality in the distribution system. The system must still collect all repeat samples required under 41.2(1)*"j"* and use them to determine whether a coliform treatment technique trigger in 41.2(1)*"l"* has been exceeded.

The decision and supporting rationale for invalidating a total coliform-positive sample under 41.2(1)*"d"*(1) must be documented in writing, and approved and signed by the supervisor of the water supply operations section or water supply engineering section and the department official who recommended the decision. The department 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 department may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative or because of poor sampling technique.

(2) Laboratory invalidation. A laboratory must invalidate a total coliform sample (unless total coliforms are detected, in which case the sample is valid) 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 that of the original sample within 24 hours of being notified of the interference problem and must have the sample analyzed for the presence of total coliforms. The system must continue to resample within 24 hours and have the samples analyzed until a valid result is obtained. The department may waive the 24-hour time limit on a case-by-case basis.

e. Routine monitoring for specific groundwater noncommunity water systems serving 1,000 or fewer people. This paragraph applies to noncommunity water systems using only groundwater (not IGW) as a source and serving 1,000 or fewer people. Groundwater noncommunity water systems that serve schools, preschools, and child care facilities, and all public water systems owned or managed by state agencies, such as parks and rest areas, must monitor at the same frequency as a like-sized community water system, in accordance with 41.2(1)*"f,"* 41.2(1)*"g,"* or 41.2(1)*"h."*

(1) General. Following any total coliform-positive sample taken under 41.2(1)*"e,"* systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in 41.2(1)*"j."* Once all monitoring required by 41.2(1)*"e"* and 41.2(1)*"j"* for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in 41.2(1)*"l"* have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by 41.2(1)*"l."*

(2) Monitoring frequency for total coliforms. Systems must monitor each calendar quarter that the system provides water to the public, with the following exceptions:

1. A system on quarterly monitoring that experiences any of the following events must begin monthly monitoring in the month following the event. The system must continue on monthly monitoring until the system meets the requirements for returning to quarterly monitoring.

- The system has an *E. coli* MCL violation.
- The system triggers one Level 2 assessment under the provisions of 41.2(1)*"l"* in a rolling 12-month period.
- The system triggers two Level 1 assessments under the provisions of 41.2(1)*"l"* in a rolling 12-month period.
- The system has a coliform treatment technique violation.
- The system has two coliform monitoring violations in a rolling 12-month period.
- The system has one monitoring coliform violation and one Level 1 assessment under the provisions of 41.2(1)*"l"* in a rolling 12-month period.

2. A system on monthly monitoring for reasons other than those identified in 41.2(1)*"e"*(2)"1" is not considered to be on increased monitoring for the purposes of 41.2(1).

3. Seasonal systems must sample each month in which they are in operation. All seasonal systems must also demonstrate completion of a department-approved start-up procedure before serving water to the public, which includes a requirement for a coliform-negative start-up sample.

(3) Evaluation of sampling frequency during a sanitary survey. During each sanitary survey, the department must evaluate the status of the system including the distribution system, to determine whether the system is on an appropriate monitoring schedule. The department may modify the system's monitoring schedule, as necessary, or may allow the system to stay on its existing monitoring schedule, consistent with the provisions of 41.2(1)*"e."*

(4) Requirements for returning from monthly to quarterly sampling frequency for nonseasonal noncommunity systems. The department may reduce the monitoring frequency for a nonseasonal noncommunity system on monthly monitoring triggered under 41.2(1)*"e"*(2)"1" to quarterly monitoring if the system meets the following criteria. For the purposes of 41.2(1)*"e"*(4), "protected water source" means the well meets separation distances from sources of microbial contamination pursuant to 567—subrule 43.3(7), Table A; or the system has 4-log virus inactivation treatment that is approved by the department and is in continuous usage.

1. Within the previous 12 months, the system must have a completed sanitary survey or voluntary Level 2 assessment, be free of sanitary defects, and have a protected water source;

2. The system must have a clean compliance history for a minimum of the previous 12 months; and

3. The department must review the approved sampling plan, which must designate the time period(s) for monitoring based on site-specific considerations (e.g., during periods of highest demand or highest vulnerability to contamination). The system must collect compliance samples during these time periods.

(5) Additional routine monitoring for systems on quarterly sampling in the month following a total coliform-positive routine sample. Systems collecting samples on a quarterly frequency must conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). Systems must collect at least three routine samples during the next month. Systems may either collect samples at regular time intervals throughout the month or may collect all required routine samples on a single day if samples are taken from different sites. Systems must use the results of additional routine samples in coliform treatment technique trigger calculations under 41.2(1)*"l."*

f. Routine monitoring for groundwater community water systems serving 1,000 or fewer people. This paragraph applies to community water systems using only groundwater (not IGW) as a source and serving 1,000 or fewer people.

(1) General. Following any total coliform-positive sample taken under 41.2(1)*"f,"* systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in 41.2(1)*"j."* Once all monitoring required by 41.2(1)*"f"* and 41.2(1)*"j"* for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in 41.2(1)*"l"* have

been exceeded. If any trigger has been exceeded, systems must complete assessments as required by 41.2(1)*"l."*

(2) Monitoring frequency for total coliforms. The routine monitoring frequency for total coliforms is one sample per month.

g. Routine monitoring requirements for SW/IGW public water systems serving 1,000 or fewer people. This paragraph applies to all public water supply systems serving 1,000 or fewer people that use surface water/influenced groundwater sources, including consecutive systems.

(1) General. Following any total coliform-positive sample taken under 41.2(1)*"g,"* systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in 41.2(1)*"j."* Once all monitoring required by 41.2(1)*"g"* and 41.2(1)*"j"* for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in 41.2(1)*"l"* have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by 41.2(1)*"l."*

(2) Monitoring frequency for total coliforms. The routine monitoring frequency for total coliforms is one sample per month. Systems may not reduce monitoring frequency.

(3) Seasonal systems must sample each month in which they are in operation, and the monitoring frequency cannot be reduced. All seasonal systems must also demonstrate completion of a department-approved start-up procedure before serving water to the public, which includes a requirement for a coliform-negative start-up sample.

h. Routine monitoring requirements for public water systems serving more than 1,000 people. The provisions of this paragraph apply to all public water systems serving more than 1,000 people except regional water systems. The requirements for regional water systems are listed in 41.2(1)*"i."*

(1) General. Following any total coliform-positive sample taken under 41.2(1)*"h,"* systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in 41.2(1)*"j."* Once all monitoring required by 41.2(1)*"h"* and 41.2(1)*"l"* for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in 41.2(1)*"l"* have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by 41.2(1)*"l."*

(2) Monitoring frequency for total coliforms. The routine monitoring frequency for total coliforms is based upon the population served by the system, as follows:

Population Served	Minimum Number of Routine Samples per Month
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60

Population Served	Minimum Number of Routine Samples per Month
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

(3) Seasonal systems must sample each month in which they are in operation, and the monitoring frequency cannot be reduced. All seasonal systems must also demonstrate completion of a department-approved start-up procedure before serving water to the public, which includes a requirement for a coliform-negative start-up sample.

(4) Reduced monitoring. Community systems may not reduce the number of required routine samples.

(5) Increased monitoring. If the department, on the basis of a sanitary survey or monitoring results history, determines that some greater frequency of monitoring is more appropriate, that frequency shall be the frequency required under these rules. The increased frequency shall be confirmed or changed on the basis of subsequent surveys.

i. Routine monitoring requirements for regional public water systems. The provisions of 41.2(1)*"i"* apply to all regional water systems. The supplier of water for a regional water system as defined in 567—40.2(455B) shall sample for coliform bacteria at a frequency based upon the miles of pipe in its distribution system.

(1) General. Following any total coliform-positive sample taken under 41.2(1)*"i,"* systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in 41.2(1)*"j."* Once all monitoring required by 41.2(1)*"i"* and 41.2(1)*"j"* for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in 41.2(1)*"l"* have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by 41.2(1)*"l."*

(2) Monitoring frequency for total coliforms. The routine monitoring frequency for total coliforms is based upon the miles of pipe in the system's distribution system, as indicated in the following chart. In no case shall the sampling frequency for a regional water system be less than as set forth in 41.2(1)*"h"* based upon the population equivalent served. The following chart represents sampling frequency per miles of pipe in the distribution system and is determined by calculating one-half the square root of the miles of pipe.

Miles of Pipe	Minimum Number of Routine Samples per Month
0 – 9	1
10 – 25	2
26 – 49	3
50 – 81	4
82 – 121	5
122 – 169	6
170 – 225	7
226 – 289	8
290 – 361	9
362 – 441	10
442 – 529	11
530 – 625	12
626 – 729	13
730 – 841	14
842 – 961	15
962 – 1,089	16
1,090 – 1,225	17
1,226 – 1,364	18
1,365 – 1,521	19
1,522 – 1,681	20
1,682 – 1,849	21
1,850 – 2,025	22
2,026 – 2,209	23
2,210 – 2,401	24
2,402 – 2,601	25
2,602 – 2,809	26
2,810 – 3,025	27
3,026 – 3,249	28
3,250 – 3,481	29
3,482 – 3,721	30
3,722 – 3,969	31
3,970 – 4,225	32
4,226 – 4,489	33
4,490 – 4,671	34
4,672 – 5,041	35
5,042 – 5,329	36
5,330 – 5,625	37
5,626 – 5,929	38
5,930 – 6,241	39
6,242 – 6,561	40
6,562 and greater	41

(3) Reduced monitoring. Regional water systems may not reduce the number of required routine samples.

(4) Increased monitoring. If the department, on the basis of a sanitary survey or monitoring results history, determines that some greater frequency of monitoring is more appropriate, that frequency shall be the frequency required under these rules. The increased frequency shall be confirmed or changed on the basis of subsequent surveys.

j. Repeat monitoring. If a routine sample taken under 41.2(1)*"e"* through 41.2(1)*"i"* is total coliform-positive, the system must collect a set of repeat samples. The department cannot waive the requirement for a system to collect repeat samples.

(1) The system must collect no fewer than three repeat samples for each total coliform-positive routine sample found.

(2) The system must collect the repeat samples within 24 hours of being notified of the positive routine sample result. The department 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 department must specify how much time the system has to collect the repeat samples.

(3) The system must collect all repeat samples on the same day, except that the department may allow a system with a single service connection to collect the required set of repeat samples over a three-day period. "System with a single service connection" means a system which supplies drinking water to consumers through a single service line.

(4) The system must collect an additional set of repeat samples in the manner specified in 41.2(1)*"j"*(1) to (3) if one or more repeat samples in the current set of repeat samples is total coliform-positive. The system must collect the additional set of repeat samples within 24 hours of being notified of the positive result, unless the department extends the limit as provided in 41.2(1)*"j"*(2). The system must continue to collect additional sets of repeat samples until either total coliforms are not detected in one complete set of repeat samples or the system determines that a coliform treatment technique trigger specified in 41.2(1)*"l"* has been exceeded as a result of a total coliform-positive repeat sample and notifies the department. If a trigger identified in 41.2(1)*"l"* is exceeded as a result of a total coliform-positive routine sample, systems are required to conduct only one round of repeat monitoring for each total coliform-positive routine sample.

(5) Results of all routine and repeat samples taken under 41.2(1)*"e"* through 41.2(1)*"i"* that are not invalidated by the department must be used to determine whether a coliform treatment technique trigger specified in 41.2(1)*"l"* has been exceeded.

k. E. coli testing requirements.

(1) If any routine or repeat sample is total coliform-positive, the system must analyze that total coliform-positive culture medium to determine the presence of *E. coli*. If *E. coli* are present, the system must notify the department by the end of the same day when the system is notified of the test result. If the notification is outside of the department's routine office hours, the system shall call the department's Environmental Emergency Reporting Hotline at (515)725-8694.

(2) The department has the discretion to allow a system, on a case-by-case basis, to forgo *E. coli* testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is *E. coli*-positive. Accordingly, the system must notify the department as specified in 41.2(1)*"k"*(1), and the provisions of 41.2(1)*"a"* apply.

l. Coliform treatment technique triggers. Systems must conduct assessments in accordance with 41.2(1)*"m"* after exceeding any treatment technique trigger.

(1) Level 1 treatment technique triggers.

1. For systems taking 40 or more samples per month, the system exceeds 5.0 percent total coliform-positive samples for the month.

2. For systems taking fewer than 40 samples per month, the system has two or more total coliform-positive samples in the same month.

3. The system fails to take every required repeat sample after any single total coliform-positive sample.

(2) Level 2 treatment technique triggers.

1. An *E. coli* MCL violation, as specified in 41.2(1)*"p"*(1).

2. A second Level 1 trigger as defined in 41.2(1)*"l"*(1) within a rolling 12-month period, unless the department has determined a likely reason that the samples that caused the first Level 1 treatment technique trigger were total coliform-positive and has established that the system has corrected the problem.

m. Assessment requirements. Systems must ensure that Level 1 and 2 assessments are conducted in order to identify the possible presence of sanitary defects and defects in distribution system coliform monitoring practices. Level 1 assessments may be conducted by the system owner or operator. Level 2 assessments must be conducted by the department with the assistance of the system owner or operator.

(1) General. When conducting assessments, systems must ensure that the assessor evaluates minimum elements that include review and identification of inadequacies in sample sites; sampling protocol; sample processing; atypical events that could affect distributed water quality or indicate that distributed water quality was impaired; changes in distribution system maintenance and operation that could affect distributed water quality (including water storage); source and treatment considerations that bear on distributed water quality, where appropriate (e.g., small groundwater systems); and existing water quality monitoring data. The system must conduct the assessment consistent with any department directives that tailor specific assessment elements with respect to the size and type of the system, and the size type, and characteristics of the distribution system.

(2) Level 1 assessment. A system must conduct a Level 1 assessment consistent with the department requirements if the system exceeds one of the treatment technique triggers in 41.2(1)*"l"*(1).

1. The system must complete the Level 1 assessment as soon as practical after any trigger in 41.2(1)*"l"*(1). In the completed assessment form, the system must describe sanitary defects detected, corrective actions completed, and a proposed timetable for any corrective actions not already completed. The system may also note on the assessment form that no sanitary defects were identified. The system must submit the completed Level 1 assessment form to the department within 30 days after the system learns that it has exceeded a trigger.

2. If the department reviews the completed Level 1 assessment and determines that the assessment is not sufficient (including any proposed timetable for any corrective actions not already completed), the department must consult with the system. If the department requires revisions after consultation, the system must submit a revised assessment form to the department on an agreed-upon schedule not to exceed 30 days from the date of the consultation.

3. Upon completion and submission of the assessment form by the system, the department must determine if the system has identified the likely cause for the Level 1 trigger and, if so, establish that the system has corrected the problem or has included a schedule acceptable to the department for correction of the problem.

(3) Level 2 assessment. A system must ensure that a Level 2 assessment is conducted if the system exceeds one of the treatment technique triggers in 41.2(1)*"l"*(2). The system must comply with any expedited actions or additional actions required by the department in the case of an *E. coli* MCL violation.

1. The system must ensure that a Level 2 assessment is completed by the department as soon as practical after any trigger in 41.2(1)*"l"*(2). The system must submit a completed Level 2 assessment form to the department within 30 days after the system learns that it has exceeded a trigger. The assessment form must contain a description of the sanitary defects detected, corrective actions completed, and a proposed timetable for any corrective actions not already completed. It may also be noted on the assessment form that no sanitary defects were identified.

2. If the department reviews the completed Level 2 assessment and determines that the assessment is not sufficient (including any proposed timetable for any corrective actions not already completed), the department must consult with the system. If the department requires revisions after consultation, the system must submit a revised assessment form to the department on an agreed-upon schedule not to exceed 30 days.

3. Upon completion and submission of the assessment form by the system, the department must determine if the system has identified the likely cause for the Level 2 trigger and determine whether the

system has corrected the problem or has included a schedule acceptable to the department for correction of the problem.

(4) Corrective actions. A system must correct sanitary defects found through either a Level 1 or 2 assessment conducted under 41.2(1)*"l."* For corrections not completed by the time of submission of the assessment form, the system must complete the corrective action(s) in compliance with a timetable approved by the department in consultation with the system. The system must notify the department when each scheduled corrective action is completed.

(5) Consultation. At any time during the assessment or corrective actions phase, either the water system or the department may request a consultation with the other party to determine the appropriate actions to be taken. The system may consult with the department on all relevant information that may impact on its ability to comply with a requirement of this subrule, including the method of accomplishment, an appropriate time frame, and other relevant information.

n. Reporting requirements.

(1) *E. coli.*

1. The system must notify the department by the end of the same day when the system learns of an *E. coli*-positive violation. If the notification is outside of the department's routine office hours, the system shall call the department's Environmental Emergency Reporting Hotline at (515)725-8694.

2. The system must notify the department by the end of the same day when the system learns of the *E. coli*-positive routine sample. If the notification is outside of the department's routine office hours, the system shall call the department's Environmental Emergency Reporting Hotline at (515)725-8694.

(2) A system that has violated the treatment technique for coliforms in 41.2(1)*"l"* must report the violation to the department no later than the end of the next business day after it learns of the violation, and must notify the public in accordance with rule 567—42.1(455B).

(3) A system required to conduct an assessment under the provisions of 41.2(1)*"l"* must submit the assessment report within 30 days. The system must notify the department in accordance with 41.2(1)*"m"*(4) when each scheduled corrective action is completed for any corrections that were not completed by the time of submission of the assessment form.

(4) A system that has failed to comply with a coliform monitoring requirement must report the monitoring violation to the department within 10 days after the system discovers the violation, and must notify the public in accordance with rule 567—42.1(455B).

(5) A seasonal system must certify, prior to serving water to the public, that it has complied with the department-approved start-up procedure.

o. Record-keeping requirements. Additional record-keeping requirements are listed in 567—paragraph 42.5(1)*"j."*

p. Violations.

(1) *E. coli* MCL violation. A system is in violation of the MCL for *E. coli* when any of the following occurs, and must conduct public notice in accordance with rule 567—42.1(455B):

1. The system has an *E. coli*-positive repeat sample following a total coliform-positive routine sample.

2. The system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample.

3. The system fails to take all required repeat samples following an *E. coli*-positive routine sample.

4. The system fails to test for *E. coli* when any repeat sample tests positive for total coliform.

(2) Treatment technique violation. A system is in violation of a treatment technique trigger when any of the following occurs, and must conduct public notice in accordance with rule 567—42.1(455B):

1. A system exceeds a treatment technique trigger specified in 41.2(1)*"l"* and then fails to conduct the required assessment within the time frame specified in 41.2(1)*"m."*

2. A system exceeds a treatment technique trigger specified in 41.2(1)*"l"* and then fails to conduct the required corrective actions within the time frame specified in 41.2(1)*"m"*(4).

3. A seasonal system fails to complete a department-approved start-up procedure prior to serving water to the public, including collection of a finished water sample that tests total coliform-negative.

(3) Monitoring violation. A system is in violation of monitoring requirements when any of the following occurs, and must conduct public notice in accordance with rule 567—42.1(455B):

1. Failure to take every required routine or additional routine sample in a compliance period.

2. Failure to analyze for *E. coli* following a total coliform-positive routine sample.

(4) Reporting violation. A system is in violation of reporting requirements when any of the following occurs, and must conduct public notice in accordance with rule 567—42.1(455B):

1. Failure to submit a monitoring report after a system properly conducts monitoring in a timely manner.

2. Failure to submit a completed assessment form after a system properly conducts an assessment in a timely manner.

3. Failure to notify the department following an *E. coli*-positive sample as required by 41.2(1)*"k"*(1) in a timely manner.

4. Failure to submit the certification of completion of department-approved start-up procedure by a seasonal system.

q. Best available technology (BAT). The U.S. Environmental Protection Agency (EPA) identifies, and the department has adopted, the following as the best technology, treatment techniques, or other means available for all systems in achieving compliance with the maximum contaminant level for *E. coli* in 41.2(1)*"a."* The following is also identified as affordable technology, treatment techniques, or other means available to systems serving 10,000 or fewer people for achieving compliance with the *E. coli* maximum contaminant level.

(1) Well protection. Protection of wells from fecal contamination by appropriate placement and construction.

(2) Disinfectant residual. Maintenance of a disinfectant residual throughout the distribution system.

(3) Distribution system maintenance. Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, cross-connection control, and continual maintenance of a minimum positive water pressure of 20 psi in all parts of the distribution system at all times.

(4) Filtration or disinfection. Filtration and disinfection of surface water or groundwater under the direct influence of surface water in accordance with 567—43.5(455B), 567—43.9(455B), and 567—43.10(455B), or disinfection of groundwater in accordance with rule 567—41.7(455B) using strong oxidants such as, but not limited to, chlorine, chlorine dioxide, or ozone.

(5) Wellhead protection program. For groundwater systems, compliance with the requirements of the department's wellhead protection program.

ITEM 9. Amend subparagraph **41.2(3)"e"(1)** as follows:

(1) Method. The heterotrophic plate count shall be performed in accordance with one of the following methods:

1. Method 9215B Pour Plate Method, Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992, 19th edition, 1995, ~~or~~ 20th edition, 1998, 21st edition, 2005, and 22nd edition, 2012. The cited method in any of ~~the three~~ these editions may be used. Standard Methods Online method 9215 B-04 may be used.

2. No change.

ITEM 10. Amend the following footnote in subparagraph **41.3(1)"b"(1)**:

**The recommended fluoride level is ~~1.1~~ 0.7 milligrams per liter ~~or the level as calculated from "Water Fluoridation, a Manual for Engineers and Technicians" Table 2-4~~ as published by the U.S. Department of Health and Human Services, Public Health Service (~~September 1986~~ July-August 2015). At this optimum level in drinking water, fluoride has been shown to have beneficial effects in reducing the occurrence of tooth decay.

ITEM 11. Amend subparagraph **41.3(1)"e"(1)** as follows:

(1) Analytical methods for IOCs. Analysis for the listed inorganic contaminants shall be conducted using the following methods, or their equivalent as determined by EPA. Criteria for analyzing arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, selenium, sodium, and thallium with digestion or directly without digestion, and other analytical test procedures are contained in Technical

Notes on Drinking Water Methods, EPA-600/R-94-173, October, 1994. This document is available from the National Technical Information Service, NTIS PB95-104766, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. The toll-free number is (800)553-6847.

INORGANIC CONTAMINANTS ANALYTICAL METHODS

Contaminant	Methodology[15]	EPA	ASTM[3]	SM	SM Online[26]	Other	Detection Limit, mg/L
Antimony	Atomic absorption; furnace			3113B[4, 27, 33]	3113 B-04, B-10		0.003
	Atomic absorption; platform	200.9[2]					0.0008[12]
	ICP-Mass spectrometry	200.8[2]					0.0004
	Atomic absorption; hydride		D3697-92, 02, 07, 12				0.001
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Arsenic[16]	ICP-Mass spectrometry	200.8[2]					0.0014[17]
	Atomic absorption; platform	200.9[2]					0.0005[15]
	Atomic absorption; furnace		D2972-97C, 03C, 08C	3113B[4, 27, 33]	3113 B-04, B-10		0.001
	Atomic absorption; hydride		D2972-97B, 03B, 08B	3114B[4, 27, 33]	3114 B-09		0.001
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Asbestos	Transmission electron microscopy	100.1[9]					0.01 MFL
	Transmission electron microscopy	100.2[10]					
Barium	Inductively coupled plasma	200.7[2]		3120B[18, 27, 33]	3120 B-99		0.002
	ICP-Mass spectrometry	200.8[2]					
	Atomic absorption; direct			3111D[4, 27, 33]	3111 D-99		0.1
	Atomic absorption; furnace			3113B[4, 27, 33]	3113 B-04, B-10		0.002
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Beryllium	Inductively coupled plasma	200.7[2]		3120B[18, 27, 33]	3120 B-99		0.0003
	ICP-Mass spectrometry	200.8[2]					0.0003
	Atomic absorption; platform	200.9[2]					0.00002[12]
	Atomic absorption; furnace		D3645-97B, 03B, 08B	3113B[4, 27, 33]	3113 B-04, B-10		0.0002
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Cadmium	Inductively coupled plasma	200.7[2]					0.001
	ICP-Mass spectrometry	200.8[2]					
	Atomic absorption; platform	200.9[2]					
	Atomic absorption; furnace			3113B[4, 27, 33]	3113 B-04, B-10		0.0001
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Chromium	Inductively coupled plasma	200.7[2]		3120B[18, 27, 33]	3120 B-99		0.007
	ICP-Mass spectrometry	200.8[2]					
	Atomic absorption; platform	200.9[2]					

Contaminant	Methodology[15]	EPA	ASTM[3]	SM	SM Online[26]	Other	Detection Limit, mg/L
	Atomic absorption; furnace			3113B[4, 27, 33]	3113 B-04, B-10		0.001
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Cyanide	Manual distillation (followed by one of the following four analytical methods:)		D2036-98A, D2036-06A	4500-CN-C[18, 27, 33]			
	Spectrophotometric; amenable[14]		D2036-98B, D2036-06B	4500-CN-G[18, 27, 33]	4500-CN-G-99		0.02
	Spectrophotometric; manual[13]		D2036-98A, D2036-06A	4500-CN-E[18, 27, 33]	4500-CN-E-99	I-3300-85[5]	0.02
	Spectrophotometric; semi-automated[13]	335.4[6]					0.005
	Selective electrode[13]			4500-CN-F[18,27, 33]	4500-CN-F-99		0.05
	~~UV/Distillation/Spectrophotometric~~ UV, distillation, spectrophotometric[22]					Kelada 01[20]	0.0005
	~~Distillation/Spectrophotometric~~ Micro distillation, flow injection, spectrophotometric[13]					QuikChem 10-204-00-1-X[21]	0.0006
	Ligand exchange with amperometry[14]		D6888-04			OIA-1677, DW[25]	0.0005
	Gas chromatography/mass spectrometry headspace					ME355.01[29]	
Fluoride	Ion chromatography	300.0[6], 300.1[23]	D4327-97, 03, 11	4110B[18, 27, 33]	4110 B-00		
	Manual distillation; colorimetric; SPADNS			4500F-B,D[18, 27, 33]	4500 F-B,D-97		
	Manual electrode		D1179-93B, 99B, D1179-04B, 10B	4500F-C[18, 27, 33]	4500 F-C-97		
	Automated electrode					380-75WE[11]	
	Automated alizarin			4500F-E[18, 27, 33]	4500 F-E-97	129-71W[11]	
	Capillary ion electrophoresis					D6508, Rev.2[24]	
	Arsenite-free colorimetric; SPADNS					Hach SPADNS 2 Method 10225[31]	
Magnesium	Atomic absorption; direct		D511-93~~B~~, 03B, 09B, 14B	3111B[4, 27, 33]	3111 B-99		
	ICP	200.7[1]		3120B[18, 27, 33]	3120 B-99		
	Complexation Titrimetric Methods		D511-93~~A~~, 03A, 09A, 14B	3500-Mg E[4]			
				3500-Mg B[19, 27, 33]	3500-Mg B-97		
	Ion chromatography		D6919-03, 09				
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Mercury	Manual, cold vapor	245.1[2]	D3223-97, 02, 12	3112B[4, 27, 33]	3112 B-09		0.0002
	Automated, cold vapor	245.2[1]					0.0002
	ICP-Mass spectrometry	200.8[2]					

Contaminant	Methodology[15]	EPA	ASTM[3]	SM	SM Online[26]	Other	Detection Limit, mg/L
Nickel	Inductively coupled plasma	200.7[2]		3120B[18, 27, 33]	3120 B-99		0.005
	ICP-Mass spectrometry	200.8[2]					0.0005
	Atomic absorption; platform	200.9[2]					0.0006[12]
	Atomic absorption; direct			3111B[4, 27, 33]	3111 B-99		
	Atomic absorption; furnace			3113B[4, 27, 33]	3113 B-04, 10		0.001
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Nitrate	Ion chromatography	300.0[6], 300.1[23]	D4327-97[2], 03, 11	4110B[18, 27, 33]	4110 B-00	B-1011[8]	0.01
	Automated cadmium reduction	353.2[6]	D3867-90A	4500-NO_3-F[18, 27, 33]	4500-NO_3-F-00		0.05
	Ion selective electrode			4500-NO_3-D[18, 27, 33]	4500-NO_3-D-00	601[7]	1
	Manual cadmium reduction		D3867-90B	4500-NO_3-E[18, 27, 33]	4500-NO_3-E-00		0.01
	Capillary ion electrophoresis					D6508, Rev.2[24]	0.076
	Reduction/colorimetric					Systea Easy (1-Reagent)[30] NECi Nitrate-Reductase[34]	
	Colorimetric; direct					Hach TNTplus™ 835/836 Method 10206[32]	
Nitrite	Ion chromatography	300.0[6], 300.1[23]	D4327-97[2], 03, 11	4110B[18, 27, 33]	4110 B-00	B-1011[8]	0.004
	Automated cadmium reduction	353.2[6]	D3867-90A	4500-NO_3-F[18, 27, 33]	4500-NO_3-F-00		0.05
	Manual cadmium reduction		D3867-90B	4500-NO_3-E[18, 27, 33]	4500-NO_3-E-00		0.01
	Spectrophotometric			4500-NO_2-B[18, 27, 33]	4500-NO_2-B-00		0.01
	Capillary ion electrophoresis					D6508, Rev. 2[24]	0.103
	Reduction/colorimetric					Systea Easy (1-Reagent)[30] NECi Nitrate-Reductase[34]	
Selenium	Atomic absorption; hydride		D3859-98~~A~~[2], 03A, 08A	3114B[4, 27, 33]	3114 B-09		0.002
	ICP-Mass spectrometry	200.8[2]					
	Atomic absorption; platform	200.9[2]					
	Atomic absorption; furnace		D3859-98~~B~~[2], 03B, 08B	3113B[4, 27, 33]	3113 B-04, 10		0.002
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Sodium	Inductively coupled plasma	200.7[2]					
	Atomic absorption; direct			3111B[4, 27, 33]	3111 B-99		
	Ion chromatography		D6919-03, 09				
	Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Revision 4.2[28]					
Thallium	ICP-Mass spectrometry	200.8[2]					
	Atomic absorption; platform	200.9[2]					0.0007[12]

The procedures shall be done in accordance with the documents listed below. 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 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 B102, Washington, DC 20460 (telephone: (202)566-2426); or at the Office of Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC.

[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 or 2003, Vols. 11.01 and 11.02, American Society for Testing and Materials (ASTM) International; ~~any year containing the cited version of the method may be used~~ the methods listed are the only versions that may be used. Copies may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

[4]18th and 19th editions of Standard Methods for the Examination of Water and Wastewater, 1992 and 1995, respectively, American Public Health Association; either edition may be used. Copies may be obtained from the American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

[5]Techniques of Water Resources Investigation of the U.S. Geological Survey, Book 5, Chapter A-1, 3rd edition, 1989, Method I-3300-85. 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, PN221890-001, 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; telephone: (508)482-2131.

[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 Microns 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]Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.

[13]Screening method for total cyanides.

[14]Measures "free" cyanides when distillation, digestion, or ligand exchange is omitted.

[15]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 by Method 200.7, sample preconcentration using pneumatic nebulization may be required to achieve lower detection limits. ~~Method 200.9 is capable of obtaining an arsenic MDL of 0.0001 mg/L using multiple depositions.~~ Preconcentration may also be required for direct analysis of antimony and thallium by Method 200.9, and antimony by Method 3113B, unless multiple in-furnace depositions are made.

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

[17]~~Using selective ion monitoring, EPA Method 200.8 (ICP-MS) is capable of obtaining an MDL of 0.0001 mg/L~~ Reserved.

[18]The 18th, 19th, and 20th editions of Standard Methods for the Examination of Water and Wastewater, 1992, 1995, and 1998, respectively, American Public Health Association; any edition may be used, except that the versions of 3111B, 3111D, 3113B, and 3114B in the 20th edition may not be used. Copies may be obtained from the American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

[19]The 20th edition of Standard Methods for the Examination of Water and Wastewater, 1998, American Public Health Association. Copies may be obtaining from the American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

[20]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 NTIS PB 2001-108275. NOTE: A 450W UV lamp may be used in this method instead of the 550W lamp specified if it provides performance within the quality control acceptance criteria of the method in a given instrument. Similarly, modified flow cell configurations and flow conditions may be used in the method, provided that the quality control acceptance criteria are met.

[21]The description for the QuikChem Method 10-204-00-1-X, "Digestion and distillation of total cyanide in drinking water 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 Road, Milwaukee, WI 53218, telephone (414)358-4200.

[22]Measures total cyanides when UV-digestor is used, and "free" cyanides when UV-digestor is bypassed.

[23]"Methods for the Determination of Organic and Inorganic Compounds in Drinking Water," Volume 1, EPA 815-R-00-014, August 2000. Available at NTIC, PB2000-106981.

[24]Method D6508, Rev. 2, "Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Electrolyte," available from Waters Corp., 34 Maple Street, Milford, MA 01757; telephone: (508)482-2131; fax: (508)482-3625.

[25]Method OIA-1677, DW "Available Cyanide by Flow Injection, Ligand Exchange, and Amperometry," January 2004. EPA-821-R-04-001. Available from ALPKEM, a division of OI Analytical, P.O. Box 9010, College Station, TX 77542-9010.

[26]Standard Methods Online is available at www.standardmethods.org. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

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

[28]EPA Method 200.5, Revision 4.2: "Determination of Trace Elements in Drinking Water by Axially Viewed Inductively Coupled Plasma-Atomic Emission Spectrometry," 2003. EPA/600/R-06/115. Available at www.nemi.gov.

[29]Method ME355.01, Revision 1.0, "Determination of Cyanide in Drinking Water by GC/MS Headspace," May 26, 2009. Available at www.nemi.gov or from H & E Testing Laboratory, 221 State Street, Augusta, ME 04333; telephone: (207)287-2727.

[30]Systea Easy (1-Reagent), "Systea Easy (1-Reagent) Nitrate Method," February 4, 2009. Available at www.nemi.gov or from Systea Scientific, LLC, 900 Jorie Blvd., Suite 35, Oak Brook, IL 60523.

[31]Hach Company Method, "Hach Company SPADNS 2 (Arsenic-free) Fluoride Method 10225 – Spectrophotometric Measurement of Fluoride in Water and Wastewater," January 2011. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539. Available at www.hach.com.

[32]Hach Company Method, "Hach Company TNTplus™ 835/836 Nitrate Method 10206 – Spectrophotometric Measurement of Nitrate in Water and Wastewater," January 2011. 5600 Lindbergh Drive, P.O. Box 389, Loveland, CO 80539. Available at www.hach.com.

[33]Standard Methods for the Examination of Water and Wastewater, 22nd edition (2012), American Public Health Association. Available from the American Public Health Association, 800 I Street, NW, Washington, DC 20001-3710.

[34]Nitrate Elimination Company, Inc. (NECi). "Method for Nitrate Reductase Nitrate-Nitrogen Analysis of Drinking Water," February 2016. Superior Enzymes, Inc., 334 Hecla Street, Lake Linden, MI 49945.

ITEM 12. Amend subrule 41.4(1), introductory paragraph, as follows:

41.4(1) *Lead, copper, and corrosivity regulation by the setting of a treatment technique requirement.* The lead and copper rules ~~do not set an MCL, although this could be changed in the future. The rules set two enforceable action levels, which trigger tap monitoring, corrosion control, source water treatment, lead service line replacement, and public education if exceeded.~~ 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.

ITEM 13. Amend subparagraph **41.4(1)"b"(3)** as follows:

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

1. 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.

2. The number of samples taken during the monitoring period shall be multiplied by 0.9.

3. The contaminant concentration in the numbered sample yielded by this calculation is the 90th percentile contaminant level.

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

5. For a public water system that has been allowed by the department to collect fewer than five samples in accordance with 41.4(1)*"c"*(3), the sample result with the highest concentration is considered the 90th percentile value.

ITEM 14. Amend subparagraph **41.4(1)"c"(2)** as follows:

(2) Sample collection methods.

1. to 4. No change.

5. An NTNC system, or a CWS system that meets the criteria of ~~567—paragraphs 42.2(4)*"h"*(1)"1" and "2,"~~ 567—subparagraph 42.2(2)*"b"*(7) that does not have enough taps that can supply first-draw samples, as defined in 567—40.2(455B), may apply to the department 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 department may waive the requirement for prior department approval of non-first-draw sample sites selected by the system, through written notification to the system.

ITEM 15. Amend subparagraph **41.4(1)"c"(3)**, introductory paragraph, as follows:

(3) Number of samples. Water systems shall collect at least one sample during each monitoring period specified in 41.4(1)*"c"*(4) from the number of sites as listed in the column below titled "standard monitoring." A system conducting reduced monitoring under 41.4(1)*"c"*(4) shall collect at least one sample from the number of sites specified in the column titled "reduced monitoring" during each monitoring period specified in 41.4(1)*"c"*(4). Such reduced monitoring sites shall be representative of the sites required for standard monitoring. A public water system that has fewer than five drinking water taps that can be used for human consumption meeting the sample site criteria of 41.4(1)*"c"*(1) to reach the required number of sample sites listed in 41.4(1)*"c"*(3) must collect at least one sample from each tap and then must collect additional samples from those taps on different days during the monitoring period to meet the required number of sites. Alternatively, the department may allow these systems to collect a number of samples less than the number of sites specified in 41.4(1)*"c"*(1), provided that 100 percent of all taps that can be used for human consumption are sampled. The department must approve this reduction of the minimum number of samples in writing based upon a request from the system or on-site verification by the department. The department may specify sampling locations when a system is conducting reduced monitoring.

ITEM 16. Amend subparagraph **41.4(1)"c"(4)** as follows:

(4) 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 (Number of People Served)	First Six-month Monitoring Period Begins on:
greater than 50,000 (large system)	January 1, 1992
3,301 to 50,000 (medium system)	July 1, 1992
less than or equal to 3,300 (small system)	July 1, 1993

All large systems shall monitor during two consecutive six-month periods. All small and medium-size systems shall monitor during each six-month monitoring period until the system exceeds the lead or copper action level and is, therefore, required to implement the corrosion control treatment requirements

under 567—paragraph 43.7(1)*"a,"* in which case the system shall continue monitoring in accordance with 41.4(1)*"c"*(4), or 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 41.4(1)*"c"*(4).

2. Monitoring after installation of corrosion control and source water treatment. Large systems which install optimal corrosion control treatment pursuant to 567—subparagraph 43.7(1)*"d"*(4) shall monitor during two consecutive six-month monitoring periods by the date specified in 567—subparagraph 43.7(1)*"d"*(5). Small or medium-size systems which install optimal corrosion control treatment pursuant to 567—subparagraph 43.7(1)*"e"*(5) shall monitor during two consecutive six-month monitoring periods as specified in 567—subparagraph 43.7(1)*"e"*(6). Systems which install source water treatment shall monitor during two consecutive six-month monitoring periods by the date specified in 567—subparagraph 43.7(3)*"a"*(4).

3. Monitoring after the department specifies water quality parameter values for optimal corrosion control. After the department specifies the values for water quality control parameters under 567—paragraph 43.7(2)*"f,"* the system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the department specifies the optimal values under 567—paragraph 43.7(2)*"f."*

4. Reduced monitoring.

- 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 lead and copper samples according to 41.4(1)*"c"*(3) and reduce the frequency of sampling to once per year. A small or medium-size water system collecting fewer than five samples as specified in 41.4(1)*"c"*(3) that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the frequency of sampling to once per year. The system may not ever reduce the number of samples required below the minimum of one sample per available tap. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.
- Any public water supply system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the department under 567—paragraph 43.7(2)*"f"* during each of two consecutive six-month monitoring periods may reduce the monitoring frequency to once per year and reduce the number of lead and copper samples according to 41.4(1)*"c"*(3), upon written approval by the department. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period. The department shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with 567—subrule 42.4(2), and shall notify the system in writing when it determines that the system is eligible to commence reduced monitoring. ~~Where appropriate, the~~ The department will 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.
- 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 meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the department under 567—paragraph 43.7(2)*"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 by the department. Samples collected once every three years shall be collected no later than every third calendar year. The department shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with 567—subrule 42.4(2), and shall notify the system in writing when it determines that the system is eligible to reduce the monitoring frequency to once every three years. ~~Where appropriate, the~~ The department will 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.

- A water system that reduces the number and frequency of sampling shall collect these samples from sites included in the pool of targeted sampling sites identified in 41.4(1)*"c"*(1). Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June through September, unless the department, at its discretion, has approved a different sampling period. If approved by the department, the 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. The department shall designate a period that represents a time of normal operation for an NTNC 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. This sampling shall begin during the period approved or designated by the department in the calendar year immediately following the end of the second consecutive six-month monitoring period for systems initiating annual monitoring and during the three-year period following the end of the third consecutive calendar year of annual monitoring for systems initiating triennial monitoring.

Systems monitoring annually that have been collecting samples during the months of June through September and that receive department approval to alter their sample collection period 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 that receive department approval to alter the sampling collection period 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 41.4(1)*"c."*

Small systems that have been granted waivers pursuant to 41.4(1)*"c"*(7), that have been collecting samples during the months of June through September and that receive department approval to alter their sample collection period as previously stated, must collect their next round of samples before the end of the nine-year period.

- Any water system that demonstrates for two consecutive six-month monitoring periods that the 90th percentile tap water level computed under 41.4(1)*"b"*(3) is less than or equal to 0.005 mg/L for lead and is less than or equal to 0.65 mg/L for copper may reduce the number of samples in accordance with 41.4(1)*"c"*(3) and reduce the frequency of sampling to once every three calendar years, if approved by the department.
- A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling according to 41.4(1)*"c"*(4)"3" and collect the number of samples specified for standard monitoring in 41.4(1)*"c"*(3). Any such system shall also conduct water quality parameter monitoring in accordance with 41.4(1)*"d"*(2), (3), or (4), 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 41.4(1)*"c"*(3) after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of 41.4(1)*"c"*(4)"4," first bulleted paragraph, and 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 41.4(1)*"c"*(4)"4," third bulleted paragraph or fifth bulleted paragraph, and has received department approval.

Any water system subject to reduced monitoring frequency that fails to meet the lead action level during any four-month monitoring period or that fails to operate at or above the minimum value or within the range of values for the water quality control parameters specified by the department under 567—paragraph 43.7(2)*"f"* for more than nine days in any six-month period specified in 41.4(1)*"d"*(4) shall resume tap water sampling according to 41.4(1)*"c"*(4)"3," collect the number of samples specified for standard monitoring in 41.4(1)*"c"*(3), and resume monitoring for water quality parameters within the distribution system in accordance with 41.4(1)*"d"*(4). This standard tap water sampling shall begin no later than the six-month period beginning January 1 of the calendar year following the lead action level exceedance or water quality parameter excursion. The 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:

The system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in 41.4(1)*"c"*(3) after it has completed two subsequent six-month rounds of monitoring that meet the criteria of 41.4(1)*"c"*(4)"4," second bulleted paragraph, and upon written approval from the department to resume reduced annual monitoring. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

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 41.4(1)*"c"*(4)"4," third bulleted paragraph or fifth bulleted paragraph, and upon written approval from the department to resume triennial monitoring.

The system may reduce the number of water quality parameter tap water samples required in 41.4(1)*"d"*(5)"1" and the sampling frequency required in 41.4(1)*"d"*(5)"2." Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates that it has requalified for triennial monitoring, pursuant to 41.4(1)*"d"*(5)"2."

- Any water system subject to a reduced monitoring frequency under 41.4(1)*"c"*(4)"4" ~~that either adds a new source of water or changes any water treatment shall inform~~ must notify the department in writing in accordance with 567—subparagraph 42.4(2)*"a"*(3) of any upcoming long-term change in treatment or addition of a new source as described in that paragraph. The department must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the system. The department may require the system to resume sampling pursuant to 41.4(1)*"c"*(4)"3" and collect the number of samples specified for standard monitoring under 41.4(1)*"c"*(3), or take other appropriate steps such as increased water quality parameter monitoring or reevaluation of its corrosion control treatment given the potentially different water quality considerations.

ITEM 17. Amend subparagraph **41.4(1)"c"(7)** as follows:

(7) Monitoring waivers for small systems. Any small system that meets the criteria of this subparagraph may apply to the department to reduce the frequency of monitoring for lead and copper under subrule 41.4(1) to once every nine years if it meets all of the materials criteria specified in 41.4(1)*"c"*(7)"1" and the monitoring criteria specified in 41.4(1)*"c"*(7)"2."

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 copper-containing materials, as defined below:

- Lead. The water system must provide certification and supporting documentation to the department that the system is free of all lead-containing materials. The system does not contain any plastic pipes which contain lead plasticizers, or plastic service lines which contain lead plasticizers. The system must be 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. 300-g-6(e).
- Copper. The water system must provide certification and supporting documentation to the department that the system contains no copper pipes or copper service lines.

2. Monitoring criteria. The system must have completed at least one six-month round of standard tap water monitoring for lead and copper at sites approved by the department and from the number of sites required by 41.4(1)*"c"*(3), 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 copper-containing materials meet the following criteria:

- Lead levels. The system must demonstrate that the 90th percentile lead level does not exceed 0.005 mg/L.
- Copper levels. The system must demonstrate that the 90th percentile copper level does not exceed 0.65 mg/L.

3. Department approval of waiver application. The department shall notify the system of its waiver determination in writing, including the basis of its decision and any condition of the waiver. The department may require as a waiver condition that the system conduct specific activities, such as limited monitoring and periodic outreach to customers to remind them to avoid installation of materials that would void the waiver. The system must continue monitoring for lead and copper at the tap as required by 41.4(1)*"c"*(4)"1" through "4," as appropriate, until the system receives written approval for the waiver from the department.

4. Monitoring frequency of systems with waivers.

- A system must conduct tap water monitoring for lead and copper in accordance with 41.4(1)*"c"*(4)"4" at the reduced number of sampling sites identified in subparagraph 41.4(1)*"c"*(3) at least once every nine years and provide the materials certification specified in 41.4(1)*"c"*(7)"1" for both lead and copper to the department along with the monitoring results. Samples collected every nine years shall be collected no later than every ninth calendar year.
- ~~If a~~ A system with a waiver ~~adds a new source of water or changes any water treatment, the system~~ must notify the department in writing pursuant to 567—subparagraph 42.4(2)*"a"*(3) of any upcoming long-term change in treatment or addition of a new source, as described in that subparagraph. The department must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the system. The department has the authority to require the system to add or modify waiver conditions, such as to require recertification that the system is free of lead-containing and copper-containing materials or to require additional monitoring, if the department deems such modifications are necessary to address treatment or source water changes at the system.
- If a system with a waiver becomes aware that it is no longer free of lead-containing or copper-containing materials, such as from new construction or repairs, the system shall notify the department 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 41.4(1)*"c"*(7)"4," the waiver will be renewed automatically, unless any of the conditions listed below occur. A system whose waiver has been revoked may reapply for a waiver at such time as it again meets the appropriate materials and monitoring criteria of 41.4(1)*"c"*(7)"1" and 41.4(1)*"c"*(7)"2."

- A system no longer satisfies the materials criteria of 41.4(1)*"c"*(7)"1," or has a 90th percentile lead level greater than 0.005 mg/L or a 90th percentile copper level greater than 0.65 mg/L.
- The department notifies the system in writing that the waiver has been revoked, including the basis of its decision.

6. Requirements following waiver revocation. A system whose waiver has been revoked by the department is subject to the corrosion control treatment and lead and copper tap water monitoring requirements as follows:

- If the system exceeds the lead or copper action level, the system must implement corrosion control treatment in accordance with the deadlines specified in 567—paragraph 43.7(1)*"e,"* and any other applicable parts of 567—41.4(455B).
- If the system meets both the lead and copper action levels, the system must monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sample sites specified in subparagraph 41.4(1)*"c"*(3).

ITEM 18. Amend subparagraph **41.4(1)"d"(1)"2,"** second bullet, as follows:

- Except as provided in 41.4(1)*"d"*(3)*"*3," systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each six-month monitoring period specified in 41.4(1)*"d"*(2). ~~During each monitoring period specified in 41.4(1)*"d"*(2).~~ During each monitoring period specified in 41.4(1)*"d"*(3) through (5), systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.

ITEM 19. Amend subparagraph **41.4(1)"d"(4)** as follows:

(4) Monitoring after the department specifies water quality parameter values for optimal corrosion control. After the department specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment, all large systems shall measure the applicable water

quality parameters according to 41.4(1)*"d"*(3) and determine compliance with the requirements of 567—paragraph 43.7(2)*"g"* every six months, with the first six-month period to begin on ~~the date~~ either January 1 or July 1, whichever comes first, after the department specifies the optimal values under 567—paragraph 43.7(2)*"f."* Any small or medium-size system shall conduct such monitoring during each monitoring period specified in 41.4(1)*"c"*(4)"3" 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 41.4(1)*"c"*(4)"4" at the time of the action level exceedance, the ~~end~~ start of the applicable six-month monitoring period under this paragraph shall coincide with the end of the applicable monitoring period under 41.4(1)*"c"*(4)"4." Compliance with department-designated optimal water quality parameter values shall be determined as specified in 567—paragraph 43.7(2)*"g."*

ITEM 20. Amend subparagraph **41.4(1)"d"(5)** as follows:

(5) Reduced monitoring.

1. Public water supply systems that maintain the range of values for the water quality parameters reflecting optimal corrosion control treatment during each of two consecutive six-month monitoring periods under 41.4(1)*"c"*(4) shall continue monitoring at the entry point(s) to the distribution system as specified in 567—paragraph 43.7(2)*"f."* 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.

REDUCED WATER QUALITY PARAMETER MONITORING

System Size (Number of People Served)	Reduced Number of Sites for Water Quality Parameters
greater than 100,000	10
10,001 to 100,000	7
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
less than or equal to 100	1

2. A public water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the department under 567—paragraph 43.7(2)*"f"* during three consecutive years of monitoring may reduce the frequency with which the system collects the number of tap samples for applicable water quality parameters specified in 41.4(1)*"d"*(5) from every six months to annually. This sampling shall begin during the calendar year immediately following the end of the monitoring period in which the third consecutive year of six-month monitoring occurs. Any system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the department under 567—paragraph 43.7(2)*"f"* during three consecutive years of annual monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in 41.4(1)*"d"*(5) from annually to every three years. This sampling shall begin no later than the third calendar year following the end of the monitoring period in which the third consecutive year of monitoring occurs.

A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in 41.4(1)*"d"*(5)"1" 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 0.005 mg/L, that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L, and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the department under 567—paragraph 43.7(2)*"f."* Monitoring conducted every three years shall be done no later than every third calendar year.

3. No change.

4. No change.

ITEM 21. Amend subparagraph **41.4(1)"e"(2)** as follows:

(2) Monitoring 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~~ no later than six months after the ~~exceedance~~ end of the monitoring period during which the lead or copper action level was exceeded. For monitoring periods that are annual or less frequent, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs or, if the department has established an alternate monitoring period, the last day of that period.

ITEM 22. Amend subparagraph **41.4(1)"e"(4)** as follows:

(4) Monitoring frequency after the department 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 department specifies maximum permissible source water levels under 567—subparagraph 43.7(3)*"b"*(4) or determines that the system is not required to install source water treatment under 567—subparagraph 43.7(3)*"b"*(2). A water system using only groundwater shall collect samples once during the three-year compliance period in effect when the department makes this determination. Such systems shall collect samples once during each subsequent compliance period. Triennial samples shall be collected every third calendar year. A public 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~~ during the year in which the department ~~makes this~~ determination is made under this subparagraph.

2. No change.

ITEM 23. Amend subparagraph **41.4(1)"e"(5)** as follows:

(5) Reduced monitoring frequency.

1. A water system using only groundwater may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle provided that the samples are collected no later than every ninth calendar year and if the system meets one of the following criteria:

- The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead or copper concentrations specified by the department in 567—subparagraph 43.7(3)*"b"*(4) during at least three consecutive compliance periods under 41.4(1)*"e"*(4)"1"; or
- The department 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 41.4(1)*"e"*(4)"1," 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 groundwater) may reduce the monitoring frequency in 41.4(1)*"e"*(4)"1" to once during each nine-year compliance cycle provided that the samples are collected no later than every ninth calendar year and if that system meets one of the following criteria:

- 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 department in 567—subparagraph 43.7(3)*"b"*(4) for at least three consecutive years; or
- The department 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. No change.

ITEM 24. Amend subparagraph **41.4(1)"f"(4)** as follows:

(4) Corrosivity indices methodology. The following methods must be used to calculate the corrosivity indices:

1. No change.

2. Langelier Index—"Standard Methods for the Examination of Water and Wastewater," 14th edition, American Public Health Association, ~~1015 15th Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710, (1975), Method 203, pp. 61-63.

ITEM 25. Amend subparagraph **41.4(1)"g"(1)**, table, as follows:

LEAD, COPPER AND WATER QUALITY PARAMETER ANALYTICAL METHODS

Contaminant	~~EPA Contaminant Code~~	Methodology[9]	Reference (Method Number)				
			EPA	ASTM[3]	SM	SM Online[16]	USGS[5] or Other
Alkalinity	~~1927~~	Titrimetric		D1067-92B, 02B, 06B, 11 B	2320 B[11, 15, 18]	2320 B-97	
		Electrometric titration					I-1030-85
Calcium	~~1919~~	EDTA titrimetric		D511-93A, 03A, 09A, 14A	3500-Ca D[4]	3500-Ca B-97	
					3500-Ca B[12, 15, 18]	3500-Ca B-97	
		Atomic absorption; direct aspiration		D511-93B, 03B, 09B, 14B	3111 B[4, 15, 18]	3111 B-99	
		Inductively coupled plasma	200.7[2]		3120 B[11, 15, 18]	3120 B-99	
		Ion chromatography		D6919-03, 09			
		Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Rev. 4.2[17]				
Chloride	~~1017~~	Ion chromatography	300.0[8], 300.1[13]	D4327-97, 03	4110 B[11, 15]	4550 B-00	
		Potentiometric titration			4500-Cl^- D[11, 15]	4500-Cl- D-97	
		Argentometric titration		D512-89B, (reapproved 1999), D512-04B	4500-Cl^- B[11, 15]	4500-Cl- B-97	
		Capillary ion electrophoresis					D6508, Rev. 2[14]
Conductivity	~~1064~~	Conductance		D1125-95A, (reapproved 1999), 14A	2510 B[11, 15, 18]	2510 B-97	
Copper[6]	~~1022~~	Atomic absorption; furnace technique		D1688-95C, 02C, 07C, 12C	3113 B[4, 15, 18]	3113 B-99, 04, 10	
		Atomic absorption; direct aspiration		D1688-95A, 02A, 07A, 12A	3111 B[4, 15, 18]	3111 B-99	
		Inductively coupled plasma	200.7[2]		3120 B[11, 15, 18]	3120 B-99	
		Inductively coupled plasma; mass spectrometry	200.8[2]				
		Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Rev. 4.2[17]				
		Atomic absorption; platform furnace	200.9[2]				

Contaminant	~~EPA Contaminant Code~~	Methodology[9]	Reference (Method Number)				
			EPA	ASTM[3]	SM	SM Online[16]	USGS[5] or Other
		Colorimetric					Hach Method 8026[19]; Hach Method 10272[20]
Lead[6]	~~1030~~	Atomic absorption; furnace technique		D3559-96D, 03D, 08D	3113 B[4, 15, 18]	3113 B-99, 04, 10	
		Inductively coupled plasma; mass spectrometry	200.8[2]				
		Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Rev. 4.2[17]				
		Atomic absorption; platform furnace technique	200.9[2]				
		Differential pulse anodic stripping ~~voltammatry~~ voltammetry					Method 1001[10]
pH	~~1925~~	Electrometric	150.1[1]	D1293-95, 99, 12	4500-H^+ B[11, 15, 18]	4500-H^+ B-00	
			150.2[1]				
Orthophosphate (Unfiltered, no digestion or hydrolysis)	~~1044~~	Colorimetric, automated, ascorbic acid	365.1[8]		4500-P F[11, 15, 18]	4500-P F-99	Thermo Fisher Discrete Analyzer[21]
		Colorimetric, ascorbic acid, single reagent		D515-88A	4500-P E[11, 15, 18]	4500-P E-99	
		Colorimetric, phosphomolybdate;					I-1602-85
		Automated-segmented flow					I-2601-90[8]
		Automated discrete					I-2598-85
		Ion chromatography	300.0[7], 300.1[13]	D4327-97, 03, 11	4110 B[11, 15, 18]	4110 B-00	
		Capillary ion electrophoresis					D6508, Rev. 2[14]
Silica	~~1049~~	Colorimetric, molybdate blue					I-1700-85
		Automated-segmented flow					I-2700-85
		Colorimetric		D859-95, 00, 05, 10			
		Molybdosilicate			4500-Si D[4]	4500-SiO_2 C-97	
					4500-SiO_2 C[12, 15, 18]	4500-SiO_2 C-97	
		Heteropoly blue			4500-Si E[15]	4500-SiO_2 D-97	
					4500-SiO_2 D[12, 15, 18]	4500-SiO_2 D-97	
		Automated method for molybdate-reactive silica			4500-Si F 4500-SiO_2 E[12, 15, 18]	4500-SiO_2 E-97	
		Inductively coupled plasma[6]	200.7[2]		3120 B[11, 15, 18]	3120 B-99	

Contaminant	~~EPA Contaminant Code~~	Methodology[9]	Reference (Method Number)				
			EPA	ASTM[3]	SM	SM Online[16]	USGS[5] or Other
		Axially viewed inductively coupled plasma-atomic emission spectrometry (AVICP-AES)	200.5, Rev. 4.2[17]				
Sulfate	~~1055~~	Ion chromatography	300.0[7], 300.1[13]	D4327-97, 03	4110[11, 15, 18]	4110 B-00	
		Automated methylthymol blue	375.2[7]		4500-SO_4 F[11, 15]	4500-SO_4-2 F-97	
		Gravimetric			4500-SO_4 C[11, 15] 4500-SO_4 D[11, 15]	4500-SO_4-2 C-97 4500-SO_4-2 D-97	
		Turbidimetric		D516-90, 02, 07	4500-SO_4 E[11, 15]	4500-SO_4-2 E-97	
		Capillary ion electrophoresis					D6508, Rev. 2[14]
Temperature	~~1996~~	Thermometric			2550 B[11, 15, 18]	2550-00, 10	
Total Filterable Residue (TDS)	~~1930~~	Gravimetric			2540 C[11, 15]	2540 C-97	

The procedures shall be done in accordance with the documents listed below. 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 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, 401 M Street, SW, Washington, DC 20460 (telephone: (202)260-3027); or at the Office of Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC.

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

[2]"Methods for the Determination of Metals in Environmental Samples," EPA-600/4-91-010, June 1991. Available at NTIS as PB91-231498.

[3]Annual Book of ASTM Standards, 1994, 1996, ~~or~~ 1999, or 2003, Vols. 11.01 and 11.02, American Society for Testing and Materials, International; ~~any year containing the cited version of the method~~ the methods listed are the only versions that may be used. The previous versions of D1688-95A and 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, Volume 11.01. Copies may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428 or www.astm.org.

[4]18th and 19th editions of Standard Methods for the Examination of Water and Wastewater, 1992 and 1995, respectively, American Public Health Association. Either edition may be used. Copies may be obtained from the American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

[5]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]Samples may not be filtered. Samples that contain less than 1 NTU (Nephelometric turbidity unit) and are properly preserved (concentrated nitric acid to pH < 2) may be analyzed directly (without digestion) for total metals; otherwise, digestion is required. When digestion is required, the total recoverable technique as defined in the method must be used.

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

[8]"Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments, Open File Report 93-125." Available from Information Services, U.S. Geological Survey, Federal Center, Box 25286, Denver, CO 80225-0425.

[9]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. Preconcentration may be required for direct analysis of lead by Methods 200.9, 3113B, and 3559-90D unless multiple in-furnace depositions are made.

[10]The description for Method 1001 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 80538.

[11]The 18th, 19th, and 20th editions of Standard Methods for the Examination of Water and Wastewater, 1992, 1995, and 1998, respectively, American Public Health Association. Any edition may be used, except that the versions of 3111B and 3113B in the 20th edition may not be used. Copies may be obtained from the American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

[12]The 20th edition of Standard Methods for the Examination of Water and Wastewater, 1998, American Public Health Association. Copies may be obtained from the American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

[13]"Methods for the Determination of Organic and Inorganic Compounds in Drinking Water," Vol. 1, EPA 815-R-00-014, August 2000. Available at NTIS, PB2000-106981.

[14]Method D6508, Rev. 2, "Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Electrolyte," available from Waters Corp., 34 Maple Street, Milford, MA 01757; telephone: (508)482-2131.

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

[16]Standard Methods Online is available at www.standardmethods.org. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

[17]EPA Method 200.5, Revision 4.2: "Determination of Trace Elements in Drinking Water by Axially Viewed Inductively Coupled Plasma-Atomic Emission Spectrometry," 2003. EPA/600/R-06/115. Available at www.nemi.gov.

[18]Standard Methods for the Examination of Water and Wastewater, 22nd edition (2012), American Public Health Association. Available from the American Public Health Association, 800 I Street, NW, Washington, DC 20001-3710.

[19]Hach Company. "Hach Method 8026 – Spectrophotometric Measurement of Copper in Finished Drinking Water," December 2015, Revision 1.2. Available from www.hach.com.

[20]Hach Company. "Hach Method 10272 – Spectrophotometric Measurement of Copper in Finished Drinking Water," December 2015, Revision 1.2. Available from www.hach.com.

[21]Thermo Fisher. "Thermo Fisher Scientific Drinking Water Orthophosphate Method for Thermo Scientific Gallery Discrete Analyzer," February 2016. Revision 5. Thermo Fisher Scientific, Ratastie 2 01620 Vantaa, Finland.

ITEM 26. Amend paragraph **41.5(1)"b"** as follows:

b. Maximum contaminant levels (MCLs) and analytical methodology for organic compounds. The maximum contaminant levels for organic chemicals are listed in the table in subparagraph 41.5(1)*"b"*(1). Analyses for the contaminants in this subrule shall be conducted using the following methods, or their equivalent as approved by EPA. For analysis of a compliance sample, a certified laboratory must be able to achieve at least the method detection limit for the specific contaminant as listed in the following table.

(1) Table:

ORGANIC CHEMICAL CONTAMINANTS, CODES, MCLS, ANALYTICAL METHODS, AND DETECTION LIMITS

Contaminant	EPA Contaminant Code	MCL (mg/L)	Methodology[1]	Detection Limit (mg/L)
Volatile Organic Chemicals (VOCs):				
Benzene	2990	0.005	502.2, 524.2, 524.3, 524.4[7]	0.0005
Carbon tetrachloride	2982	0.005	502.2, 524.2, 524.3, 524.4[7], 551.1	0.0005
Chlorobenzene (mono)	2989	0.1	502.2, 524.2, 524.3, 524.4[7]	0.0005
1,2-Dichlorobenzene (ortho)	2968	0.6	502.2, 524.2, 524.3, 524.4[7]	0.0005
1,4-Dichlorobenzene (para)	2969	0.075	502.2, 524.2, 524.3, 524.4[7]	0.0005

Contaminant	EPA Contaminant Code	MCL (mg/L)	Methodology[1]	Detection Limit (mg/L)
1,2-Dichloroethane	2980	0.005	502.2, 524.2, 524.3, 524.4[7]	0.0005
1,1-Dichloroethylene	2977	0.007	502.2, 524.2, 524.3, 524.4[7]	0.0005
cis-1,2-Dichloroethylene	2380	0.07	502.2, 524.2, 524.3, 524.4[7]	0.0005
trans-1,2-Dichloroethylene	2979	0.1	502.2, 524.2, 524.3, 524.4[7]	0.0005
Dichloromethane	2964	0.005	502.2, 524.2, 524.3, 524.4[7]	0.0005
1,2-Dichloropropane	2983*	0.005	502.2, 524.2, 524.3, 524.4[7]	0.0005
Ethylbenzene	2992	0.7	502.2, 524.2, 524.3, 524.4[7]	0.0005
Styrene	2996	0.1	502.2, 524.2, 524.3, 524.4[7]	0.0005
Tetrachloroethylene	2987	0.005	502.2, 524.2, 524.3, 524.4[7], 551.1	0.0005
Toluene	2991	1	502.2, 524.2, 524.3, 524.4[7]	0.0005
1,1,1-Trichloroethane	2981	0.2	502.2, 524.2, 524.3, 524.4[7], 551.1	0.0005
Trichloroethylene	2984	0.005	502.2, 524.2, 524.3, 524.4[7], 551.1	0.0005
1,2,4-Trichlorobenzene	2378	0.07	502.2, 524.2, 524.3, 524.4[7]	0.0005
1,1,2-Trichloroethane	2985	0.005	502.2, 524.2, 524.3, 524.4[7], 551.1	0.0005
Vinyl chloride	2976	0.002	502.2, 524.2, 524.3, 524.4[7]	0.0005
Xylenes (total)	2955*	10	502.2, 524.2, 524.3, 524.4[7]	0.0005
Synthetic Organic Chemicals (SOCs):				
Alachlor[3]	2051	0.002	505, 507, 508.1, 525.2, 525.3, 551.1	0.0002
Aldicarb	2047	0.003	531.1, 6610	0.0005
Aldicarb sulfone	2044	0.002	531.1, 6610	0.0008
Aldicarb sulfoxide	2043	0.004	531.1, 6610	0.0005
Atrazine[3]	2050	0.003	505, 507, 508.1, 523, 525.2, 525.3, 536, 551.1, Syngenta AG-625[5]	0.0001
Benzo(a)pyrene	2306	0.0002	525.2, 525.3, 550, 550.1	0.00002
Carbofuran	2046	0.04	531.1, 531.2, 6610, 6610B, 6610 B-04[2]	0.0009
Chlordane[3]	2959	0.002	505, 508, 508.1, 525.2, 525.3	0.0002
2,4-D[6] (as acids, salts, and esters)	2105	0.07	515.1, 515.2, 515.3, 515.4, 555, D5317-93, 98 (Reapproved 2003), 6610B, 6640-B, 6640 B-01, 6640 B-06	0.0001
Dalapon	2031	0.2	515.1, 515.3, 515.4, 552.1, 552.2, 552.3, 557, 6640, 6610B, 6640-B, 6640 B-01, 6640 B-06	0.001

Contaminant	EPA Contaminant Code	MCL (mg/L)	Methodology[1]	Detection Limit (mg/L)
1,2-Dibromo-3-chloropropane (DBCP)	2931	0.0002	504.1, 524.3, 551.1	0.00002
Di(2-ethylhexyl)adipate	2035	0.4	506, 525.2, 525.3	0.0006
Di(2-ethylhexyl)phthalate	2039	0.006	506, 525.2, 525.3	0.0006
Dinoseb[6]	2041	0.007	515.1, 515.2, 515.3, 515.4, 555, 6610B, 6640-B, 6640 B-01, 6640 B-06	0.0002
Diquat	2032	0.02	549.2	0.0004
Endothall	2033	0.1	548.1	0.009
Endrin[3]	2005	0.002	505, 508, 508.1, 525.2, 525.3, 551.1	0.00001
Ethylene dibromide (EDB)	2946	0.00005	504.1, 524.3, 551.1	0.00001
Glyphosate	2034	0.7	547, 6651, 6651B, 6651 B-00, 6640 B-05	0.006
Heptachlor[3]	2065	0.0004	505, 508, 508.1, 525.2, 525.3, 551.1	0.00004
Heptachlor epoxide[3]	2067	0.0002	505, 508, 508.1, 525.2, 525.3, 551.1	0.00002
Hexachlorobenzene[3]	2274	0.001	505, 508, 508.1, 525.2, 525.3, 551.1	0.0001
Hexachlorocyclopentadiene[3]	2042	0.05	505, 508, 508.1, 525.2, 525.3, 551.1	0.0001
Lindane (gamma BHC)[3]	2010	0.0002	505, 508, 508.1, 525.2, 525.3, 551.1	0.00002
Methoxychlor[3]	2015	0.04	505, 508, 508.1, 525.2, 525.3, 551.1	0.0001
Oxamyl	2036	0.2	531.1, 531.2, 6610, 6610B, 6610 B-04[2]	0.002
Pentachlorophenol	2326	0.001	515.1, 515.2, 515.3, 515.4, 525.2, 525.3, 555, D5317-93, 98 (Reapproved 2003), 6610B, 6640-B, 6640 B-01, 6640 B-06	0.00004
Picloram[3, 6]	2040	0.5	515.1, 515.2, 515.3, 515.4, 555, D5317-93, 98 (Reapproved 2003), 6610B, 6640-B, 6640 B-01, 6640 B-06	0.0001
Polychlorinated biphenyls[4] (as decachlorobiphenyl) (as Arochlors)[3]	2383	0.0005	508A 505, 508, 508.1, 525.2, 525.3	0.0001
Simazine[3]	2037	0.004	505, 507, 508.1, 523, 525.2, 525.3, 536, 551.1	0.00007
2,3,7,8-TCDD (dioxin)	2063	$3x10^{-8}$	1613	$5x10^{-9}$
2,4,5-TP[6] (Silvex)	2110	0.05	515.1, 515.2, 515.3, 515.4, 555, D5317-93, 98 (Reapproved 2003), 6610B, 6640-B, 6640 B-01, 6640 B-06	0.0002
Toxaphene[3]	2020	0.003	505, 508, 508.1, 525.2, 525.3	0.001

*As of January 1, 1999, the contaminant codes for the following compounds were changed from the Iowa Contaminant Code to the EPA Contaminant Code:

Contaminant	Iowa Contaminant Code (Old)	EPA Contaminant Code (New)
1,2 Dichloropropane	2325	2983
Xylenes (total)	2974	2955

[1]Analyses for the contaminants in this section shall be conducted using the following EPA methods or their equivalent as approved by EPA. 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, EPA West, 1301 Constitution Avenue, NW, Room ~~B102~~ 3334, Washington, DC 20460 (telephone: (202) 566-2426); or at the ~~Office of the Federal Register, 800 North Capitol Street NW, Suite 700, Washington, DC~~ National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202)741-6030, or via Internet at www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

The following methods are available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161 (telephone: (800)553-6847).

Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised July 1991 (NTIS PB91-231480): Methods 508A and 515.1.

Methods for the Determination of Organic Compounds in Drinking Water—Supplement I, EPA-600/4-90-020, July 1990 (NTIS PB91-146027): Methods 547, 550, 550.1.

Methods for the Determination of Organic Compounds in Drinking Water—Supplement II, EPA-600/R-92-129, August 1992 (NTIS PB92-207703): Methods 548.1, 552.1, 555.

Methods for the Determination of Organic Compounds in Drinking Water—Supplement III, EPA-600/R-95-131, August 1995 (NTIS PB95-261616): Methods 502.2, 504.1, 505, 506, 507, 508, 508.1, 515.2, 524.2, 525.2, 531.1, 551.1, 552.2.

EPA Method 523, "Determination of Triazine Pesticides and Their Degradates in Drinking Water by Gas Chromatography/Mass Spectrometry (GC/MS)," 2011. EPA-815-R-11-002. Available at www.nepis.epa.gov.

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

EPA Method 525.3, "Determination of Semivolatile Organic Chemicals in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatograph/Mass Spectrometry (GC/MS)," 2012. EPA/600/R-12-010. Available at www.nepis.epa.gov.

EPA Method 536, "Determination of Triazine Pesticides and Their Degradates in Drinking Water by Liquid Chromatography Electrospray Ionization Tandem Mass Spectrometry (LC/ESI-MS/MS)," 2007. EPA/815-B-07-002. Available at www.nepis.epa.gov.

EPA Method 557, "Determination of Haloacetic Acids, Bromate, and Dalapon in Drinking Water by Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)," September 2009. EPA 815-B-09-012. Available at www.nemi.gov.

Method 1613 "Tetra-through Octa-Chlorinated Dioxins and Furans by Isotope-Dilution HRGC/HRMS," EPA-821-B-94-005, October 1994 (NTIS PB95-104774).

The following American Public Health Association (APHA) documents are available from APHA, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

Supplement to the 18th Edition of Standard Methods for the Examination of Water and Wastewater, 1994, Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995, ~~or~~ 20th edition, 1998, 21st edition, 2005, or 22nd edition, 2012 (any of ~~the three~~ these editions may be used), APHA: Method 6610 and (carbofuran and oxamyl only) 6610B and 6610 B-04; Method 6640B (21st and 22nd editions only) and SM online 6640 B-01 for 2,4-D, 2,4,5-TP Silvex, dalapon, dinoseb, pentachlorophenol, and picloram; Method 6651B (21st and 22nd editions only) and SM online 6670-B-00 for glyphosate.

Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992, 19th edition, 1995, or 20th edition, 1998, (any of ~~the three~~ these editions may be used), APHA: Method 6651.

The following American Society for Testing and Materials (ASTM) method is available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

Annual book of ASTM Standards, 1999, Vol. 11.02 (or any edition published after 1993), ASTM: D5317-93, 98 (Reapproved 2003).

Methods 515.3 and 549.2 are available from U.S. EPA NERL, 26 W. Martin Luther King Drive, Cincinnati, OH 45268.

Method 515.4, "Determination of Chlorinated Acids in Drinking Water by Liquid-Liquid Microextraction, Derivatization and Fast Gas Chromatography with Electron Capture Detection," Revision 1.0, April 2000, EPA 815/B-00/001 and EPA Method 552.3, "Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection," Revision 1.0, July 2003, EPA 815-B-03-002, available at www.epa.gov/safewater/methods/sourcalt.html.

Method 531.2, "Measurement of n-Methylcarbamoyloximes and n-Methylcarbamates in Water by Direct Aqueous Injection HPLC with ~~Photocol-umn~~ Postcolumn Derivatization," Revision 1.0, September 2001, EPA 815/B-01/002, available at www.epa.gov/safewater/methods/sourcalt.html.

Syngenta AG-625 Method, "Atrazine in Drinking Water by Immunoassay," February 2001, is available from Syngenta Crop Protection, Inc., 410 Swing Road, P.O. Box 18300, Greensboro, NC 27419, telephone (336)632-6000.

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).

[2]~~Reserved.~~ Standard Methods Online is available at www.standardmethods.org. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

[3]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-phosphorus detector may be used provided all regulatory requirements and quality control criteria are met.

[4]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 Method 508. 508.1, or 525.2.

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

[6]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, 98 (Reapproved 2003).

[7]EPA Method 524.4, Version 1.0. "Measurement of Purgeable Organic Compounds in Water by Gas Chromatography/Mass Spectrometry Using Nitrogen Purge Gas," May 2013, EPA 815-R-13-002.

(2) and (3) No change.

ITEM 27. Amend numbered paragraph **41.5(1)"c"(7)"4,"** table, fourth row, as follows:

Sources of Contamination	Shallow Wells as defined in 567—40.2(455B)	Deep Wells as defined in 567—40.2(455B)
Chemical and mineral storage (aboveground)	200 ft	l00 ft

ITEM 28. Amend subparagraph **41.6(1)"d"(2)** as follows:

(2) 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	EPA Method[1]	Standard Method[2]	ASTM Method[3]
TTHM			
P&T/GC/EICD & PID	502.2[4]		
P&T/GC/MS	524.2, 524.3, 524.4		
LLE/GC/ECD	551.1		
HAA5			
LLE (diazomethane)/GC/ECD		6251 B[5], 6251 B-07[12]	
SPE (acidic methanol)/GC/ECD	552.1[5]		
LLE (acidic methanol)/GC/ECD	552.2, 552.3		
Ion chromatography electrospray ionization tandem mass spectrometry (IC-ESI-MS/MS)	557[10]		
Bromate			

Contaminant and Methodology	EPA Method[1]	Standard Method[2]	ASTM Method[3]
Ion chromatography	300.1		D 6581-00
Ion chromatography & postcolumn reaction[9]	317.0 Rev. 2.0[6], 326.0[6]		
IC/ICP-MS[9]	321.8[6,7]		
Two-dimensional ion chromatography (IC)	302.0[11]		
Ion chromatography electrospray ionization tandem mass spectrometry (IC-ESI-MS/MS)	557[10]		
Chemically suppressed ion chromatography			D 6581-08 A
Electrolytically suppressed ion chromatography			D 6581-08 B
Chlorite[8]			
Amperometric titration		4500-ClO_2 E[8]	
Amperometric sensor			ChlordioX Plus[8,13]
Spectophotometry	327.0 Rev. 1.1[8]		
Ion chromatography	300.0, 300.1, 317.0 Rev. 2, 326.0		
Chemically suppressed ion chromatography			D 6581-08 A
Electrolytically suppressed ion chromatography			D 6581-08 B

ECD = electron capture detector
EICD = electrolytic conductivity detector
GC = gas chromatography
IC = ion chromatography
LLE = liquid/liquid extraction
MS = mass spectrometer
P&T = purge and trap
PID = photoionization detector
SPE = solid phase extractor

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents was approved by the Director of the Federal Register on February 16, 1999, 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, 401 M Street, SW, Washington, DC 20460 (telephone: (202)260-3027); or at the Office of Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC 20408.

[1]EPA: The following methods are available from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161 (telephone: (800)553-6847):

Methods 300.0 and 321.8: 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).

Method 300.1: "Determination of Inorganic Anions in Drinking Water by Ion Chromatography, Revision 1.0," EPA-600/R-98/118, 1997 (available through NTIS, PB98-169196).

Method 317.0: "Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography with the Addition of a Postcolumn Reagent for Trace Bromate Analysis, Revision 2.0," USEPA, July 2001, EPA 815-B-01-001.

Method 326.0: "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, Revision 1.0," USEPA, June 2002, EPA 815-R-03-007.

Method 327.0: "Determination of Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry, Revision 1.1," USEPA, May 2005, EPA 815-R-05-008.

Methods 502.2, 524.2, 551.1, and 552.2: Methods for the Determination of Organic Compounds in Drinking Water—Supplement III, EPA-600/R-95-131, August 1995 (NTIS PB95-261616).

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

Method 524.4: "Measurement of Purgeable Organic Compounds in Water by Gas Chromatography/Mass Spectrometry Using Nitrogen Purge Gas, Version 1.0," May 2013. EPA 815-R-13-002. Available at www.nepis.epa.gov.

Method 552.1: Methods for the Determination of Organic Compounds in Drinking Water—Supplement II, EPA-600/R-92-129, August 1992 (NTIS PB92-207703).

Method 552.3: "Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection, Revision 1.0," USEPA, July 2003, EPA-815-B-03-002.

[2]4500-ClO2 E and 6251B: Standard Methods for the Examination of Water and Wastewater, 19th (1995), ~~and~~ 20th (1998), 21st (2005), and 22nd (2012) editions, American Public Health Association, ~~1995 and 1998, respectively,~~ which ~~is~~ are available from the American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

[3]Method D 6581-00: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohoken, PA 19428: Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 2001 (or any year containing the cited version).

[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 and postcolumn reaction or IC/ICP-MS must be used for bromate analysis for purposes of demonstrating eligibility of reduced monitoring.

[7]Samples must be preserved at sample collection 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 41.6(1)*"c"*(3)"1." Ion chromatography must be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the distribution system, as prescribed in 41.6(1)*"c"*(3)"2" and "3."

[9]These are the only methods approved for reduced bromate monitoring under 41.6(1)*"c"*(2)"2."

[10]EPA Method 557, "Determination of Haloacetic Acids, Bromate, and Dalapon in Drinking Water by Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)," August 2009. EPA 815-B-09-012. Available at www.nemi.gov.

[11]EPA Method 302.0, "Determination of Bromate in Drinking Water Using Two-Dimensional Ion Chromatography with Suppressed Conductivity Detection," September 2009. EPA 815-B-014. Available at www.nemi.gov.

[12]Standard Methods Online is available at www.standardmethods.org. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

[13]ChlordioX Plus. "Chlorine Dioxide and Chlorite in Drinking Water by Amperometry Using Disposable Sensors," November 2013. Available from Palintest Ltd., Jamike Avenue (Suite 100), Erlanger, KY 41018.

ITEM 29. Amend paragraph **41.6(3)"c"** as follows:

c. Routine monitoring. Systems are required to start monitoring at the locations specified in the approved disinfection byproducts monitoring plan and on the schedule specified in 41.6(3)*"a"*(1). Each system must monitor the disinfection byproducts at the minimum number of locations identified in the Routine Monitoring table.

Routine Monitoring

Source water type	Population size category	Monitoring frequency	Total number of distribution system monitoring location sites per monitoring period
SW/IGW	<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
Groundwater	<500	per year	2
	500-9,999	per year	2
	10,000-99,999	per quarter	4
	100,000-499,999	per quarter	6

(1) to (4) No change.

ITEM 30. Amend paragraph **41.6(3)"d"** as follows:

d. Reduced monitoring. A system may reduce monitoring to the level specified in the Reduced Monitoring table anytime the locational running annual average is less than or equal to half the MCL

for TTHM and HAA5 at all monitoring locations (i.e., less than or equal to 0.040 mg/L for TTHM and 0.030 mg/L for HAA5). Only data collected under the provisions of this rule may be used to qualify for reduced monitoring.

Reduced Monitoring

Source water type	Population size category	Monitoring frequency[1]	Distribution system monitoring location sites per monitoring period[2]
SW/IGW	<500	per year	Monitoring may not be reduced
	500-3,300	per year	1 sample per year at the same location if the highest TTHM and HAA5 measurements occurred at the same location and in the same quarter, analyzed for both TTHM and HAA5
	3,301-9,999	per year	2 samples: 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 samples: one at the highest TTHM LRAA location and one at the highest HAA5 LRAA location
	50,000-249,999	per quarter	4 samples: one sample each at the highest two TTHM LRAA locations and one sample each at the highest two HAA5 LRAA locations
	250,000-999,999	per quarter	6 samples: one sample each at the highest three TTHM LRAA locations and one sample each at the highest three HAA5 LRAA locations
Groundwater	<500	every third year	1 sample ~~per year~~ at the same location if the highest TTHM and HAA5 measurements occurred at the same location and in the same quarter, analyzed for both TTHM and HAA5
	500-9,999	per year	1 sample per year at the same location if the highest TTHM and HAA5 measurements occurred at the same location and in the same quarter, analyzed for both TTHM and HAA5
	10,000-99,999	per year	2 samples: 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 samples: one at the highest TTHM LRAA location and one at the highest HAA5 LRAA location

[1]Systems on a quarterly monitoring frequency must collect the sample(s) every 90 days.

[2]Each sample must be analyzed for all TTHM and HAA5 components.

(1) to (4) No change.

ITEM 31. Adopt the following **new** rule 567—41.7(455B):

567—41.7(455B) Groundwater rule: sanitary survey, microbial source water monitoring, treatment technique.

41.7(1) *General requirements.*

a. *Scope.* The requirements of this rule constitute national primary drinking water regulations.

b. *Applicability.* This rule applies to all public water systems that use groundwater except that it does not apply to public water systems that combine all of their groundwater with surface water or with influenced groundwater prior to treatment under 567—43.5(455B). For the purposes of this

rule, "groundwater system" is defined as any public water system meeting this applicability statement, including consecutive systems receiving finished groundwater. For the purposes of this rule, "4-log treatment of viruses" means treatment that includes inactivation, removal, or a department-approved combination of inactivation and removal before or at the first customer of 4-log (99.99%) of viruses.

c. General requirements. Systems subject to this rule must comply with the following requirements:

(1) Sanitary survey information requirements for all groundwater systems as described in 41.7(2).

(2) Microbial source water monitoring requirements for groundwater systems that do not treat all of their groundwater to at least 99.99 percent (4-log) treatment of viruses, using inactivation, removal, or a department-approved combination of inactivation and removal before or at the first customer, as described in 41.7(3).

(3) Treatment technique requirements, as described in 41.7(4), that apply to groundwater systems that have fecally contaminated source waters, as determined by source water monitoring conducted under 41.7(3), or that have significant deficiencies that are identified by the department. A groundwater system with fecally contaminated source water or with significant deficiencies subject to the treatment technique requirements of this rule must implement one or more of the following corrective action options:

1. Correct all significant deficiencies;
2. Provide an alternate source of water;
3. Eliminate the source of contamination; or
4. Provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a department-approved combination of 4-log virus inactivation and removal) before or at the first customer.

(4) Groundwater systems that provide at least 4-log treatment of viruses are required to conduct compliance monitoring to demonstrate treatment effectiveness, as described in 41.7(4).

(5) If requested by the department, groundwater systems must provide the department with any existing information that will enable the department to perform a hydrogeologic sensitivity assessment. For the purposes of this rule, "hydrogeologic sensitivity assessment" is a determination of whether groundwater systems obtain water from hydrogeologically sensitive settings.

(6) Certified laboratory requirements. Analyses under this rule shall only be conducted by laboratories that have been certified by the department and are in compliance with the requirements of 567—Chapter 83.

41.7(2) *Sanitary surveys for groundwater systems.* For the purposes of this rule, a "sanitary survey," as conducted by the department in accordance with 567—subrule 43.1(7), includes but is not limited to the following: an on-site review of the water sources (identifying sources of contamination using results of source water assessments or other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system to evaluate the adequacy of the system, its sources and operations and the distribution of safe drinking water.

41.7(3) *Groundwater source microbial monitoring and analytical methods.* A groundwater system that has a department-approved 4-log treatment process for viruses and is fulfilling the requirements of 41.7(4)*"b"* is not required to conduct the triggered source water monitoring under 41.7(3)*"a."*

a. Triggered source water monitoring.

(1) General requirements. A groundwater system must conduct triggered source water monitoring if the conditions identified as follows exist:

1. The system does not provide at least 4-log treatment of viruses for each groundwater source; and
2. The system is notified that a sample collected under 41.2(1)*"e"* through 41.2(1)*"i"* is total coliform-positive, and the sample is not invalidated under 41.2(1)*"d."*

(2) Sampling requirements. A groundwater system must collect at least one groundwater source sample from each groundwater source in use at the time the total coliform-positive sample was collected under 41.2(1)*"e"* through 41.2(1)*"i"* that could have reasonably contributed to the positive sample. The source sample must be collected within 24 hours of when the system is notified of the total coliform-positive sample.

1. The department may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the groundwater source water sample within 24 hours due to circumstances beyond the system's control. In the case of an extension, the department must specify how much time the system has to collect the sample.

2. A groundwater system serving 1,000 or fewer people may use a repeat sample collected from a groundwater source to meet both the requirements of 41.2(1)*"j"* and to satisfy the monitoring requirements of 41.7(3)*"a"* if:

- The department approves the use of *E. coli* as the fecal indicator,
- The system only has one groundwater source required to be sampled,
- The system has no treatment, and
- Should the source water sample be *E. coli*-positive, the system would incur an acute coliform bacteria maximum contaminant level violation, must comply with Tier 1 public notification requirements, and must also comply with the additional sample monitoring in 41.7(3)*"a"*(3).

(3) Additional samples required. Unless the department requires corrective action for a valid triggered source water sample that tested positive for the fecal indicator, the system must collect five additional source water samples from that same source within 24 hours of being notified of the fecal indicator-positive sample result.

(4) Further requirements for consecutive and wholesale systems.

1. In addition to the other requirements in 41.7(3)*"a,"* a consecutive groundwater system that has a total coliform-positive sample collected under 41.2(1)*"f"* through 41.2(1)*"i"* must notify the wholesale system(s) within 24 hours of being notified of the total coliform-positive sample.

2. In addition to the other requirements in 41.7(3)*"a,"* a wholesale groundwater system that does not provide the 4-log treatment of viruses as described in 41.7(3) must comply with the following:

- A wholesale groundwater system that receives notice from a consecutive system it serves that a sample collected under 41.2(1)*"f"* through 41.2(1)*"i"* is total coliform-positive must, within 24 hours of being notified, collect triggered sample(s) from its groundwater source(s) under 41.7(3)*"a"*(2) and analyze the sample(s) for a fecal indicator.
- If the triggered source sample(s) is fecal indicator-positive, the wholesale groundwater system must notify all consecutive systems served by that groundwater source of the fecal indicator-positive result within 24 hours of being notified of the result and must collect the required additional five samples from the source within 24 hours under 41.7(3)*"a"*(3).

(5) Exceptions to the triggered source water monitoring requirements. A groundwater system is not required to comply with the source water monitoring requirements of 41.7(3)*"a"* if either of the following conditions exists:

1. The department determines and documents in writing that the total coliform-positive sample collected under 41.2(1)*"e"* through 41.2(1)*"i"* is caused by a distribution system deficiency; or

2. The total coliform-positive sample collected under 41.2(1)*"e"* through 41.2(1)*"i"* is collected at a location that meets department criteria for distribution system conditions that will cause total coliform-positive samples.

b. Assessment source water monitoring. If directed by the department, groundwater systems must conduct assessment source water monitoring that meets department-determined requirements for such monitoring. A groundwater system conducting assessment source water monitoring may use a triggered source water sample collected under 41.7(3)*"a"*(2) to meet the requirements of this paragraph. Department-determined assessment source water monitoring requirements may include:

(1) Collection of a total of 12 groundwater source samples that represent each month the system provides groundwater to the public;

(2) Collection of samples from each well unless the system obtains written department approval to conduct monitoring at one or more wells within the groundwater system that are representative of multiple wells used by that system and that draw water from the same hydrogeologic setting;

(3) Collection of a standard sample volume of at least 100 mL for fecal indicator analysis regardless of technical indicator or analytical method used;

(4) Analysis of all groundwater source samples using one of the analytical methods listed in 41.7(3)*"c"* for the presence of *E. coli*, enterococci, or coliphage;

(5) Collection of groundwater source samples at a location before any treatment of the groundwater source unless the department approves a sampling location after treatment; and

(6) Collection of groundwater source samples at the well itself unless the system's configuration does not allow for sampling at the well itself and the department approves an alternate sampling location that is representative of the water quality of that well.

c. Analytical methods.

(1) A groundwater system subject to the source water monitoring requirements of this rule must collect a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used.

(2) A groundwater system must analyze all groundwater source samples collected under 567—41.7(455B) using one of the analytical methods in the following table for the presence of *E. coli*, enterococci, or coliphage.

Analytical Methods for Source Water Monitoring

Fecal Indicator[1]	Methodology	Method Citation
E. coli	Colilert[3]	9223B[2, 12, 13] 9223 B-97, B-04[18]
	Colisure[3]	9223B[2, 12, 13] 9223B-97, B-04[18]
	Membrane filter method with MI agar	EPA Method 1604[4]
	Colilert-18	9223B[2, 12, 13] 9223B-97, B-04[18]
	m-ColiBlue24 Test[5]	
	E*Colite Test[6]	
	EC-MUG[7]	9221F[2, 13] 9221 F-06[18]
	NA-MUG[7]	9222G[2]
	Readycult	Readycult[14]
	Colitag	Modified Colitag[15]
	Chromocult	Chromocult[16]
	Tecta EC/TC	Tecta EC/TC[19]
Enterococci	Multiple-tube technique	9230B[2] 9230 B-04[18]
	Membrane filter technique	9230C[2]
	Membrane filter technique	EPA Method 1600[8]
	Enterolert[9]	
Coliphage	Two-step enrichment presence-absence procedure	EPA Method 1601[10], FastPhage[17]
	Single agar layer procedure	EPA Method 1602[11]

Analyses must be conducted in accordance with the documents listed below. The Director of the Federal Register approves the incorporation by reference of the documents listed in footnotes 2 through 11 in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the documents may be obtained from the sources listed below. Copies may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW, EPA West Room B102, Washington, DC 20460; (telephone: (202)566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202)741-6030, or go to: www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. The address for EPA's Water Resource Center, referenced in several of the footnotes, is EPA Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW, Washington, DC 20460.

[1]The time from sample collection to initiation of analysis may not exceed 30 hours. The groundwater system is encouraged but is not required to hold samples below 10°C during transit.

[2]Methods are described in Standard Methods for the Examination of Water and Wastewater, 20th edition (1998), and copies may be obtained from the American Public Health Association, 800 I Street, NW, Washington, DC 20001-3710.

[3]Medium is available through IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, ME 04092.

[4]EPA Method 1604: Total Coliforms and *Escherichia coli* in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium); September 2002, EPA 821-R-02-024. Method is available at www.nemi.gov.

[5]A description of the m-ColiBlue24 Test, "Total Coliforms and *E. coli* Membrane Filtration Method with m-ColiBlue24 Broth," Method No. 10029, Revision 2, August 17, 1999, is available from Hach Company, 100 Dayton Avenue, Ames, IA 50010.

[6]A description of the E*Colite Test, "Charm E*Colite Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Drinking Water," January 9, 1998, is available from Charm Sciences, Inc., 659 Andover Street, Lawrence, MA 01843-1032.

[7]EC-MUG (Method 9221F) or NA-MUG (Method 9222G) can be used for *E. coli* testing step as described in 41.2(1)*"f"*(6) or (7) after use of Standard Method 9221B, 9221D, 9222B, or 9222C.

[8]EPA Method 1600: Enterococci in Water by Membrane Filtration Using Membrane-Enterococcus Indoxyl-β-D-Glucoside Agar (MEI), EPA 821-R-02-022 (September 2002), is an approved variation of Standard Method 9230C. The method is available at www.nemi.gov. The holding time and temperature for groundwater samples is specified in footnote 1 above, rather than as specified in Section 8 of EPA Method 1600.

[9]Medium is available through IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, ME 04092. Preparation and use of the medium is set forth in the article "Evaluation of Enterolert for Enumeration of Enterococci in Recreational Waters" by Budnick, G.E., Howard, R.T., and Mayo, D.R., 1996, Applied and Environmental Microbiology, 62:3881-3884.

[10]EPA Method 1601: Male-Specific (F+) and Somatic Coliphage in Water by Two-Step Enrichment Procedure; April 2001, EPA 821-R-01-030. Method is available at www.nemi.gov.

[11]EPA Method 1602: Male-Specific (F+) and Somatic Coliphage in Water by Single Agar Layer (SAL) Procedure; April 2001, EPA 821-R-01-029. Method is available at www.nemi.gov.

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

[13]Standard Methods for the Examination of Water and Wastewater, 22nd edition (2012). Available from the American Public Health Association, 800 I Street, NW, Washington, DC 20001-3710.

[14]Readycult Method, "Readycult Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters," January 2007, Version 1.1. Available from EMD Millipore, 290 Concord Road, Billerica, MA 01821.

[15]Modified Colitag Method, "Modified Colitag Test Method for the Simultaneous Detection of *E. coli* and Other Total Coliforms in Water (ATP D05-0035)," August 28, 2009. Available from www.nemi.gov or CPI International, 5580 Skylane Blvd., Santa Rosa, CA 95403.

[16]Chromocult Method, "Chromocult Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters," November 2000, Version 1.0. Available from EMD Millipore, 290 Concord Road, Billerica, MA 01821.

[17]Charm Sciences, Inc., "FastPhage Test Procedure. Presence/Absence for Coliphage in Ground Water with Same Day Positive Prediction," Version 009, November 2012. Available at www.charmsciences.com.

[18]Standard Methods Online is available at www.standardmethods.org. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

[19]Tecta EC/TC. "Presence/Absence Method for Simultaneous Detection of Total Coliforms and *Escherichia coli* in Drinking Water," April 2014. Available from Veolia Water Solutions and Technologies, Suite 4697, Biosciences Complex, 116 Barrie Street, Kingston, Ontario, Canada K7L 3N6.

d. Invalidation of a fecal indicator-positive groundwater source sample.

(1) A groundwater system may obtain invalidation from the department of a fecal indicator-positive groundwater source sample collected under 41.7(3)*"a"* only under these conditions:

1. The system provides the department with written notice from the laboratory that improper sample analysis occurred; or

2. The department determines and documents in writing that there is substantial evidence that a fecal indicator-positive groundwater source sample is not related to source water quality.

(2) If the department invalidates a fecal indicator-positive groundwater source sample, the system must collect another source water sample under 41.7(3)*"a"* within 24 hours of being notified by the department of its invalidation decision. The sample must be analyzed for the same fecal indicator using the analytical methods in 41.7(3)*"c."* The department may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the source water sample within 24 hours due to circumstances beyond the system's control. In the case of an extension, the department must specify how much time the system has to collect the sample.

e. Sampling location.

(1) Any groundwater source sample required under 41.7(3)*"a"* must be collected at a location prior to any treatment of the groundwater source unless the department approves a sampling location after treatment.

(2) If the system's configuration does not allow for sampling at the well itself, the system may collect a sample at a department-approved location to meet the requirements of 41.7(3)*"a"* if the sample is representative of the water quality of that well.

f. New sources. A groundwater system that places a new groundwater source into service must conduct assessment source water monitoring as directed by the department to include those items listed in 41.7(3)*"b"*(3) to (6). If directed by the department, the system must begin monitoring before the groundwater source is used to provide water to the public.

g. Public notification. A system with a groundwater source sample collected under 41.7(3)*"a"* or 41.7(3)*"b"* that is fecal indicator-positive and that is not invalidated under 41.7(3)*"d,"* including consecutive systems served by the groundwater source, must conduct Tier 1 public notification under 567—subrule 42.1(2).

h. Monitoring violations. Failure to meet the requirements of 41.7(3)*"a"* through 41.7(3)*"f"* is a monitoring violation and requires the system to provide Tier 3 public notification under 567—subrule 42.1(4).

41.7(4) *Treatment technique requirements for groundwater systems.*

a. Groundwater systems with significant deficiencies or source water fecal contamination.

(1) The treatment technique requirements of this subrule, 41.7(4), must be met by groundwater systems when a significant deficiency is identified or when a groundwater source sample collected under 41.7(3)*"a"*(3) is fecal indicator-positive.

(2) If directed by the department, a groundwater system with a groundwater source sample collected under 41.7(3)*"a"*(2), 41.7(3)*"a"*(4), or 41.7(3)*"b"* that is fecal indicator-positive must comply with the treatment technique requirements of 41.7(4).

(3) When a significant deficiency is identified at a surface water or influenced groundwater system that also uses a groundwater source not under the influence of surface water, the system must comply with provisions of 41.7(4)*"a"* except in cases where the department determines that the significant deficiency is in a portion of the distribution system that is served solely by the surface water or influenced groundwater source.

(4) Unless the department directs the groundwater system to implement a specific corrective action, the groundwater system must consult with the department regarding the appropriate corrective action within 30 days of receiving written notice from the department of a significant deficiency, written notice from a laboratory that a groundwater source sample collected under 41.7(3)*"a"*(3) was found to be fecal

indicator-positive, or direction from the department that a fecal indicator-positive sample collected under 41.7(3)*"a"*(2), 41.7(3)*"a"*(4), or 41.7(3)*"b"* requires corrective action. For the purposes of 41.7(4), significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the department determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

(5) Within 120 days, or earlier if directed by the department, of receiving written notification from the department of a significant deficiency, written notice from a laboratory that a groundwater source sample collected under 41.7(3)*"a"*(3) was found to be fecal indicator-positive, or direction from the department that a fecal indicator-positive sample collected under 41.7(3)*"a"*(2), 41.7(3)*"a"*(4), or 41.7(3)*"b"* requires corrective action, the groundwater system must either:

1. Have completed corrective action in accordance with applicable department plan review processes or other department guidance or direction, if any, including department-specified interim measures; or

2. Be in compliance with a department-approved corrective action plan and schedule subject to the specified conditions as follows:

- Any subsequent modifications to a department-approved corrective action plan and schedule must also be approved by the department; and
- If the department specifies interim measures for protection of the public health pending department approval of the corrective action plan and schedule, or pending completion of the corrective action plan, the system must comply with these interim measures as well as with any schedule specified by the department.

(6) Corrective action alternatives. Groundwater systems that meet the conditions of 41.7(4)*"a"*(1) or (2) must implement one or more of the following corrective action alternatives:

1. Correct all significant deficiencies;
2. Provide an alternate source of water;
3. Eliminate the source of contamination; or
4. Provide treatment that reliably achieves at least 4-log treatment of viruses for the groundwater source.

(7) Special notice to the public of significant deficiencies or source water fecal contamination.

1. In addition to the applicable Tier 1 public notification requirements of 567—subrule 42.1(2), a community groundwater system that receives notice from the department of a significant deficiency or notification of a fecal indicator-positive groundwater source sample that is not invalidated by the department under 41.7(3)*"d"* must inform the public served by the water system under 567—subparagraph 42.3(3)*"h"*(5) of the fecal indicator-positive source sample or of any significant deficiency that has not been corrected. The system must continue to inform the public annually until the significant deficiency is corrected or the fecal contamination in the groundwater source is determined by the department to be corrected under 41.7(3)*"a"*(5).

2. In addition to the applicable Tier 1 public notification requirements of 567—subrule 42.1(2), a noncommunity groundwater system that receives notice from the department of a significant deficiency must inform the public served by the water systems in a manner approved by the department of any significant deficiency that has not been corrected within 12 months of being notified by the department or earlier if directed by the department. The system must continue to inform the public annually until the significant deficiency is corrected. The information must include:

- The nature of the significant deficiency and the date the significant deficiency was identified by the department;
- The department-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed; and
- For systems with a large proportion of non-English speaking consumers, as determined by the department, information in the applicable language(s) regarding the importance of the notice or a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.

3. If directed by the department, a noncommunity water system with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how the deficiencies were corrected, and the dates of correction under 41.7(4)*"a"*(7)"2."

b. Compliance monitoring.

(1) Existing groundwater sources. A groundwater system that provides at least 4-log treatment of viruses must make a written application to the department in order to avoid the source water monitoring requirements of 41.7(3). Notification to the department must include engineering, operational, or other information that the department requests to evaluate the submission. The department must approve the 4-log request in writing before the system can avoid the groundwater source monitoring requirements. The system's operation permit will include the mandatory operational requirements for the approved 4-log virus treatment. If the system subsequently discontinues 4-log treatment of viruses of a groundwater source or no longer wishes to be exempt from the groundwater source monitoring requirements, the system must conduct groundwater source monitoring as required under 41.7(3).

(2) New groundwater sources. A groundwater system that places a groundwater source in service that is not required to meet the source water monitoring requirements of 41.7(4) because the system provides at least 4-log treatment of viruses for the groundwater source must comply with the following requirements:

1. The system must notify the department in writing that it provides at least 4-log treatment of viruses for the groundwater source. Notification to the department must include engineering, operational, or other information that the department requests to evaluate the submission. The contact time values for inactivation of viruses using free chlorine, chlorine dioxide, and ozone are listed in 567—Chapter 43, Appendix C. No CT table is provided for chloramines and total chlorine because the CT values would be prohibitively high for groundwater systems.

2. The system must conduct compliance monitoring as required under 41.7(4)*"b"*(3) within 30 days of placing the source in service.

3. The system must conduct groundwater source monitoring under 41.7(3) if the system subsequently discontinues 4-log treatment of viruses for the groundwater source.

(3) Monitoring requirements. A groundwater system subject to the requirements of 41.7(4)*"a"* and 41.7(4)*"b"*(1) and (2) must monitor the effectiveness and reliability of treatment for that groundwater source before or at the first customer as follows:

1. Chemical disinfection.

- A groundwater system serving more than 3,300 people must continuously monitor the residual disinfectant concentration, using analytical methods specified in 567—subparagraph 43.5(4)*"a"*(5), at a location approved by the department and must record the lowest residual disinfectant concentration each day that water from the groundwater source is served to the public. The groundwater system must maintain the department-determined minimum residual disinfectant concentration every day the groundwater system serves water from the groundwater source to the public. If there is a failure in the continuous monitoring equipment, the groundwater system must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service. The system must resume continuous residual disinfectant monitoring within 14 days.
- A groundwater system serving 3,300 or fewer people must monitor the residual disinfectant concentration using analytical methods specified in 567—subparagraph 43.5(4)*"a"*(5) at a location approved by the department and must record the residual disinfectant concentration each day that water from the groundwater source is served to the public. The groundwater system must maintain the department-determined minimum residual disinfectant concentration every day the groundwater system serves water from the groundwater source to the public. The groundwater system must take a daily grab sample during the hour of peak flow or at another time specified by the department. If any daily grab sample measurement falls below the department-determined minimum residual disinfectant concentration, the groundwater system must take follow-up samples every four hours until the residual disinfectant concentration is restored to the department-determined minimum level. Alternatively, a groundwater system that serves 3,300 or fewer people may monitor continuously and meet the requirements of 41.7(4)*"b"*(3)"1," first bulleted paragraph.

2. Membrane filtration. A groundwater system that uses membrane filtration to meet the requirements of 41.7(4)*"b"* to provide at least 4-log treatment of viruses must monitor the membrane filtration process in accordance with all department-specified monitoring requirements and must operate the membrane filtration in accordance with all department-specified compliance requirements. A groundwater system that uses membrane filtration is in compliance with the requirement to achieve at least 4-log removal of viruses when:

- The membrane has an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses;
- The membrane process is operated in accordance with department-specified compliance requirements; and
- The integrity of the membrane is intact.

3. Alternative treatment. A groundwater system that uses a department-approved alternative treatment to meet the requirements of 41.7(4)*"b"* by providing at least 4-log treatment of viruses must:

- Monitor the alternative treatment in accordance with all department-specified monitoring requirements; and
- Operate the alternative treatment in accordance with all compliance requirements that the department determines to be necessary to achieve at least 4-log treatment of viruses.

c. Discontinuing treatment. A groundwater system may discontinue 4-log treatment of viruses for a groundwater source if the department determines and documents in writing that 4-log treatment of viruses is no longer necessary for that groundwater source. A system that discontinues 4-log treatment of viruses is subject to the source water monitoring and analytical methods requirements of 41.7(3).

d. Monitoring violation. Failure to meet the monitoring requirements of 41.7(4)*"b"* is a monitoring violation and requires the groundwater system to provide Tier 3 public notification under 567—subrule 42.1(4).

41.7(5) *Treatment technique violations for groundwater systems.* A groundwater system must give Tier 2 public notification under 567—subrule 42.1(3) for the treatment technique violations specified in 41.7(5)*"a,"* 41.7(5)*"b,"* and 41.7(5)*"c."*

a. Significant deficiency. A groundwater system with a significant deficiency is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the department) of receiving written notice from the department of the significant deficiency, the system:

(1) Does not complete corrective action in accordance with any applicable department plan review processes or other department guidance and direction, including department-specified interim actions and measures; or

(2) Is not in compliance with a department-approved corrective action plan and schedule.

b. Fecal indicator-positive source sample. Unless the department invalidates a fecal indicator-positive groundwater source sample under 41.7(3)*"d"*(1), a groundwater system is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the department) of meeting the conditions of 41.7(4)*"a"*(1) or (2), the system:

(1) Does not complete corrective action in accordance with any applicable department plan review processes or other department guidance and direction, including department-specified interim measures; or

(2) Is not in compliance with a department-approved corrective action plan and schedule.

c. Failure to maintain 4-log treatment. A groundwater system subject to the requirements of 41.7(4)*"b"*(3) that fails to maintain at least 4-log treatment of viruses for a groundwater source is in violation of the treatment technique requirement if the failure is not corrected within four hours of the determination that the system is not maintaining at least 4-log treatment of viruses before or at the first customer.

41.7(6) *Reporting and record keeping for groundwater systems.*

a. Reporting. In addition to meeting the requirements of 567—subrule 42.4(1), a groundwater system regulated under this rule must provide the following information to the department:

(1) A groundwater system conducting compliance monitoring under 41.7(4)*"b"* must notify the department any time the system fails to meet any of the department-specified requirements for 4-log virus treatment including, but not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within four hours. The groundwater system must notify the department as soon as possible, but in no case later than the end of the next business day.

(2) After completing any corrective action under 41.7(4)*"a,"* a groundwater system must notify the department within 30 days of completion of the corrective action.

(3) If a groundwater system subject to the requirements of 41.7(3)*"a"* does not conduct source water monitoring under 41.7(3)*"a"*(5)"2," the system must provide documentation to the department within 30 days of the total coliform-positive sample that it met the department's criteria.

b. Record keeping. In addition to the requirements in 567—subrule 42.5(1), a groundwater system regulated under this rule must maintain the following information in its records:

(1) Documentation of corrective actions, which must be kept for a period of not less than ten years.

(2) Documentation of notice to the public as required under 41.7(4)*"a"*(7), which must be kept for a period of not less than three years.

(3) Records of decisions under 41.7(3)*"a"*(5)"2" and records of invalidation of fecal indicator-positive groundwater source samples under 41.7(3)*"d"*(1), both of which must be kept for a period of not less than five years.

(4) For consecutive systems, documentation of notification to the wholesale system(s) of total coliform-positive samples that are not invalidated under 41.2(1)*"d,"* which must be kept for a period of not less than five years.

(5) For systems, including wholesale systems, that are required to perform compliance monitoring under 41.7(4)*"b"*(1), the following documentation must be maintained:

1. Records of the department-specified minimum disinfectant residual, which must be kept for a period of not less than ten years.

2. Records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the department-prescribed minimum residual disinfectant concentration for a period of more than four hours, both of which must be kept for a period of not less than five years.

ITEM 32. Amend subparagraph **41.8(1)"d"(1)** as follows:

(1) Radionuclide Analytical Methodology Table.

RADIONUCLIDE ANALYTICAL METHODOLOGY

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] & beta	Evaporation	900.0	p. 1	00-01	p. 1	302, 7110B, 7110 B-00		R-1120-76		
Gross alpha[11]	Co-precipitation			00-02		7110C, 7110 C-00				
Radium-226	Radon emanation	903.1	p. 16	Ra-04	p. 19	305, 7500-Ra C, 7500Ra C-01	D 3454-97, 05	R-1141-76	Ra-04	NY[9]
	Radiochemical	903.0	p. 13	Ra-03		304, 7500-Ra B, 7500-Ra B-01	D 2460-97, 07	R-1140-76		GA[14]
Radium-228	Radiochemical	904.0	p. 24	Ra-05	p. 19	7500-Ra D, 7500-Ra D-01		R-1142-76		NY[9] NJ[10] GA[14]
Uranium[12]	Radiochemical	908.0				7500-U B, 7500-U B-00				
	Fluorometric	908.1				7500-U C (17th edition)	D 2907-97	R-1180-76 R-1181-76	U-04	
	ICP-MS	200.8[13]				3125	D 5673-03, 05, 10			
	Alpha spectrometry			00-07	p. 33	7500-U C, 7500-U C-00	D 3972-97, 02, 09	R-1182-76	U-02	
	Laser phosphorimetry						D 5174-97, 02, 07			
	Alpha liquid scintillation spectrometry						D 6239-09			
Man-made:										
Radioactive Cesium	Radiochemical	901.0	p. 4			7500-Cs B, 7500-Cs B-00	D 2459-72	R-1111-76		

Contaminant	Methodology	Reference (method or page number)								
		EPA[1]	EPA[2]	EPA[3]	EPA[4]	SM[5]	ASTM[6]	USGS[7]	DOE[8]	Other
	Gamma ray spectrometry	901.1			p. 92	7120, 7120-97	D 3649-91, 98a, 06	R-1110-76	4.5.2.3	
Radioactive Iodine	Radiochemical	902.0	p. 6 p. 9			7500-I B, 7500-I B-00 7500-I C, 7500-I C-00 7500-I D, 7500-I D-00	D 3649-91, 98a, 06			
	Gamma ray spectrometry	901.1			p. 92	7120, 7120-97	D 4785-93, 00a, 08		4.5.2.3	
Radioactive Strontium 89, 90	Radiochemical	905.0	p. 29	Sr-04	p. 65	303, 7500-Sr B, 7500-Sr B-01		R-1160-76	Sr-01 Sr-02	
Tritium	Liquid scintillation	906.0	p. 34	H-02	p. 87	306, 7500-^{3}H B, 7500-^{3}H B-00	D 4107-91, 98 (Reapproved 2002), 08	R-1171-76		
Gamma emitters	Gamma ray spectrometry	901.1 902.0 901.0			p. 92	7120 7500-Cs B, 7500-Cs B-00 7500-I B, 7500-I B-00	D 3649-91, 98a, 06 D 4785-93, 00a, 08	R-1110-76	Ga-01-R	

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 20460 (telephone (202)566-2426); or at the Office of Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC.

[1]"Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA 600/4-80-032, August 1980. Available at the US Department of Commerce, NTIS, 5285 Port Royal Road, Springfield, VA 22161 (telephone (800)553-6847) PB 80-224744.

[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, ~~or~~ 20th, 21st, and 22nd editions, 1971, 1989, 1992, 1995, 1998, 2005, and 2012. Available at American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710. 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, 21st, and 22nd editions. Method 7110C ~~is~~ and Method 7500-U C Alpha spectrometry are in the 18th, 19th, ~~and~~ 20th, 21st, and 22nd editions. Method 7500-U C Fluorimetric Uranium is only in the 17th ~~edition~~ and 21st editions. ~~Method 7500-U C Alpha spectrometry is only in the 18th, 19th, and 20th editions.~~ Method 7120 is only in the 19th, ~~and~~ 20th, 21st, and 22nd editions. Method 3125 is only in the 20th edition. Methods 7110 B-00, 7110 C-00, 7500-Ra B-01, 7500-Ra C-01, 7500-Ra D-01, 7500-U B-00, 7500-U C-00, 7500-I B-00, 7500-I C-00, 7500-I D-00, 7120-97, 7500-Sr B-01, and 7500-^{3}H B-00 are available online at www.standardmethods.org. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

[6]Annual Book of ASTM Standards, ~~Vol.~~ Volumes 11.01 and 11.02, ~~1999~~ 2002. Any year containing the cited version of the method may be used. Available at ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

[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 ~~US~~ 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~~ edition, 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, ~~US~~ 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 Center 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 to 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 1," EPA 600-R-94-111, May 1994. Available at NTIS, PB 95-125472.

[14]"The Determination of Radium-226 and Radium-228 in Drinking Water by Gamma-Ray Spectrometry Using HPGW or Ge(Li) Detectors," Revision 1.2, December 2004. Available from Environmental Resources Center, Georgia Institute of Technology, 620 Cherry Street, Atlanta, GA 30332-0335; telephone: (404)894-3776.

ITEM 33. Amend subparagraph **42.1(2)"a"(1)** as follows:

(1) Violation of the MCL for ~~total coliforms when fecal coliform or~~ *E. coli* ~~are present in the water distribution system~~, as specified in 567—paragraph ~~41.2(1)*"b."*~~ 41.2(1)*"a."*

ITEM 34. Rescind and reserve subparagraph **42.1(2)"a"(2)**.

ITEM 35. Adopt the following **new** subparagraph **42.1(2)"a"(11)**:

(11) Detection of *E. coli*, enterococci, or coliphage in source water samples, as specified in 567—paragraphs 41.7(3)*"a"* and 41.7(3)*"b."*

ITEM 36. Amend subparagraph **42.1(2)"b"(2)** as follows:

(2) Initiate consultation with the department as soon as practical, but no later than 24 hours after the system learns of the violation or situation, to determine additional public notice requirements. For consultation with department staff after normal business hours, the system should contact the department via the ~~Emergency Response~~ department's Environmental Emergency Reporting Hotline telephone number ~~(515)281-8694~~ (515)725-8694; and

ITEM 37. Amend paragraph **42.1(3)"a"** as follows:

a. Violations and situations which require Tier 2 notice. The following types of violations or situations require Tier 2 public notice:

(1) and (2) No change.

(3) Failure to comply with the requirements of any compliance schedule prescribed in an operation permit, administrative order, or court order pursuant to 567—subrule 43.2(5); ~~and~~

(4) Failure to comply with a health advisory as determined by the department~~.~~; and

(5) Failure to take corrective action or failure to maintain at least 4-log treatment of viruses (using inactivation, removal, or a department-approved combination of 4-log virus inactivation and removal) before or at the first customer under 567—paragraph 41.7(4)*"a."*

ITEM 38. Amend subparagraph **42.1(3)"b"(2)** as follows:

(2) The public water system must repeat the notice every three months as long as the violation or situation persists, unless the department determines that appropriate circumstances warrant a different repeat frequency. If the department determines that a repeat notice frequency of longer than every three months is allowed, that decision must be made in writing by the department and must be on a case-by-case basis. In no circumstance may the repeat notice be given less frequently than once per year. Repeat notices for a ~~total~~ coliform bacteria MCL, a treatment technique violation under 567—paragraph 41.2(1)*"a"* or 41.2(1)*"l,"* or a turbidity treatment technique violation under rule 567—43.9(455B) or 567—43.10(455B) must be made every three months or more frequently.

ITEM 39. Amend subparagraph **42.1(3)"b"(3)** as follows:

(3) A public water system using surface water or influenced groundwater with a treatment technique violation resulting from a single exceedance of the maximum allowable turbidity limit pursuant to ~~rule 567—43.5(455B) or~~ 567—43.9(455B) or 567—43.10(455B) must consult with the department 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 or Tier 2 public notice is required to protect public health. For consultation with department staff after normal business hours, the system should contact the department via the department's Environmental Emergency Reporting Hotline telephone number (515)725-8694. If the consultation does not occur within the 24-hour period, the public water system must distribute a Tier 1 notice of the violation within the next 24 hours, or no later than 48 hours after the system learns of the violation, following the requirements of paragraphs 42.1(2)*"b"* and 42.1(2)*"c."*

ITEM 40. Amend paragraph **42.1(4)"a"** as follows:

a. Violations and situations which require Tier 3 notice. The following types of violations or situations require Tier 3 public notice:

(1) to (6) No change.

(7) Failure to retain a certified operator in accordance with 567—subrule 43.1(5) and the department determines that public notification is required; ~~and~~

(8) Failure to maintain records required under 567—Chapters 41, 42, and 43; and

~~(8)~~ (9) Any other situation where the department determines public notification is needed.

ITEM 41. Rescind rule 567—42.2(455B) and adopt the following **new** rule in lieu thereof:

567—42.2(455B) Lead consumer notice and public education for lead action level exceedance. All CWS and NTNC systems must comply with the lead consumer notice in accordance with 42.2(1). A CWS or NTNC system that exceeds the lead action level based on tap water samples collected in accordance with 567—paragraph 41.4(1)*"c"* must comply with the public education requirements in accordance with 42.2(2).

42.2(1) *Lead consumer notice.* All CWS and NTNC systems must provide a consumer notice of lead tap water monitoring results to persons served at the sites (taps) that are tested as listed in 567—42.2(455B). Any system exceeding the lead action level shall also implement the public education requirements of 42.2(2).

a. Reporting requirement. All CWS and NTNC systems must provide a notice of the individual tap results from lead tap water monitoring carried out under the requirements of 567—paragraph 41.4(1)*"c"* to the persons served by the water system at the specific sampling site from which the sample was taken (e.g., the occupants of the residence where the tap was tested).

b. Timing of notification. A water system must provide the consumer notice as soon as practical, but no later than 30 days after the system learns of the tap monitoring results.

c. Content of notice. The consumer notice must include the following:

(1) Results of the lead tap water monitoring for the tap that was tested,

(2) An explanation of the health effects of lead,

(3) A list of steps consumers can take to reduce exposure to lead in drinking water,

(4) Contact information for the water utility, and

(5) The lead maximum contaminant level goal of 0 mg/L and the 90th percentile lead action level of 0.015 mg/L and the definitions for these two terms from rule 567—40.2(455B).

d. Delivery of notice. The consumer notice must be provided to persons served at the tap that was tested, either by mail or by another method approved by the department. For example, upon approval by the department, an NTNC system could post the results on a bulletin board in the facility to allow users to review the information. The system must provide the notice to customers at sample taps tested, including consumers who do not receive water bills.

e. Inclusion of copper results. The system may also include results of copper testing in the notice along with the 90th percentile copper action level of 1.3 mg/L, copper MCLG of 1.3 mg/L, and health effects language.

42.2(2) *Lead public education for lead action level exceedance.* A water system that exceeds the lead action level based on tap water samples collected in accordance with 567—paragraph 41.4(1)*"c"* shall deliver the public education materials contained in 42.2(2)*"a"* in accordance with 42.2(2)*"b."* Water systems that exceed the lead action level must sample the tap water of any customer who requests it in accordance with 42.2(2)*"c."*

a. Content of written public education materials. CWS and NTNC systems must include the following elements in printed materials (e.g., brochures and pamphlets) in the same order as listed in this paragraph. In addition, language in 42.2(2)*"a"*(1), (2), and (6) must be included in the materials exactly as written, except for the text in brackets in these paragraphs for which the water system must substitute system-specific information. Any additional information presented by a water system must be consistent with the information in 42.2(2)*"a"* and be in plain language that can be understood by the general public. Water systems must submit all written public education materials to the department prior to delivery. The department may require the system to obtain approval of the content of written public education materials prior to delivery.

(1) The following information must be included exactly as written. "IMPORTANT INFORMATION ABOUT LEAD IN YOUR DRINKING WATER. [*Insert name of water system*] found elevated levels of lead in drinking water in some homes/buildings. Lead can cause serious health problems, especially for pregnant women and young children. Please read this information closely to see what you can do to reduce lead in your drinking water."

(2) The following information must be included exactly as written. "Health effects of lead. Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development."

(3) Sources of lead. The printed materials must:

1. Explain what lead is.

2. Explain possible sources of lead in drinking water and how lead enters drinking water and include information on home/building plumbing materials and service lines that may contain lead.

3. Discuss other important sources of lead exposure in addition to drinking water (e.g., paint).

(4) Discuss the steps the consumers can take to reduce their exposure to lead in drinking water as follows:

1. Encourage running the water to flush out the lead.

2. Explain concerns with using hot water from the tap and specifically caution against the use of hot water for preparing baby formula.

3. Explain that boiling the water does not reduce lead levels.

4. Discuss other options consumers can take to reduce exposure to lead in drinking water, such as alternative sources or treatment of water.

5. Suggest that parents have their child's blood tested for lead.

(5) The printed materials must explain why there are elevated levels of lead in the system's drinking water (if known) and what the water system is doing to reduce the lead levels in homes/buildings in this area.

(6) The following information must be included exactly as written. "For more information, call us at [*insert your telephone number*] or visit our website at [*insert your website link here*]. For more information on reducing lead exposure around your home/building and the health effects of lead, visit EPA's website at www.epa.gov/lead or contact your health care provider."

(7) Community water systems must also include the following elements:

1. Tell consumers how to get their water tested.

2. Discuss lead in plumbing components and the difference between low lead and lead free.

b. Delivery of public education materials.

(1) Outreach to non-English speaking consumers. For public water systems serving a large proportion of non-English speaking consumers, as determined by the department, the public education materials 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 public education materials or to request assistance in the appropriate language.

(2) Delivery of public education at CWS. A CWS that exceeds the lead action level on the basis of tap water samples collected in accordance with 567—paragraph 41.4(1)*"c"* and that is not already conducting public education tasks under 42.2(2) must conduct the public education tasks within 60 days of the date of notification of the action level exceedance:

1. Deliver printed materials meeting the content requirements of 42.2(2)*"a"* to all bill-paying customers.

2. Contact customers who are most at risk by delivering education materials that meet the content requirements of 42.2(2)*"a"* to local public health agencies even if they are not located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or CWS's users. The water system must contact the local public health agencies directly by phone or in person. The local public health agencies may provide a specific list of additional community-based organizations serving target populations, which may include organizations outside the service area of the water system. If such lists are provided, systems

must deliver education materials that meet the content requirement of 42.2(2)*"a"* to all organizations on the provided lists.

3. Contact customers who are most at risk by delivering materials that meet the content requirements of 42.2(2)*"a"* to the following organizations that are located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community public water supply system's users:

- Public and private schools or school boards;
- Women, Infants, and Children (WIC) and Head Start programs;
- Public and private hospitals and medical clinics;
- Pediatricians;
- Family planning clinics; and
- Local welfare agencies.

4. Make a good-faith effort to locate the following organizations within the service area and to deliver to them materials that meet the content requirements of 42.2(2)*"a,"* along with an informational notice that encourages distribution to all potentially affected customers or users. The good-faith effort to contact at-risk customers may include requesting a specific contact list of these organizations from the local public health agencies, even if the agencies are not located within the water system's service area:

- Licensed child care centers;
- Public and private preschools;
- Obstetricians, gynecologists, and midwives.

5. No less often than quarterly, provide information on or in each water bill as long as the system exceeds the action level for lead. The message on the water bill must include the following statement exactly as written except for the text in brackets for which the water system must substitute system-specific information: "[*insert name of water system*] found high levels of lead in drinking water in some homes. Lead can cause serious health problems. For more information, please call [*insert telephone number of water system*] or visit [*insert your website link here*]."

The message or delivery mechanisms can be modified in consultation with the department; specifically, the department may allow a separate mailing of public education materials to customers if the water system cannot place the information on water bills.

6. Post material meeting the content requirements of 42.2(2)*"a"* on the water system's website if the system serves a population greater than 100,000.

7. Submit a press release to newspaper, television, and radio stations.

8. In addition to including those items previously listed, systems must implement at least three activities from one or more of the following categories. The educational content and selection of these activities must be determined in consultation with the department.

- Public service announcement;
- Paid advertisement;
- Public area information displays;
- Emails to customers;
- Public meetings;
- Household deliveries;
- Targeted individual customer contact;
- Direct material distribution to all multifamily homes and institutions; and
- Other methods approved by the department.

For systems that are required to conduct monitoring annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or if the department has established an alternate monitoring period, the last day of that period.

(3) Continuing public education at a CWS. As long as a CWS exceeds the action level, it must repeat the activities pursuant to 42.2(2)*"b"*(2) as follows:

1. A CWS shall repeat the tasks contained in 42.2(2)*"b"*(2)"1," "2," and "8" every 12 months.
2. A CWS shall repeat the tasks contained in 42.2(2)*"b"*(2)"5" with each billing cycle.

3. A CWS serving a population greater than 100,000 shall post and retain material on a publicly accessible website pursuant to 42.2(2)*"b"*(2)"6."

4. A CWS shall repeat the task in 42.2(2)*"b"*(2)"7" twice every 12 months on a schedule agreed upon with the department. The department can allow activities in 42.2(2)*"b"*(2) to extend beyond the 60-day requirement if needed for implementation purposes on a case-by-case basis; however, this extension must be approved in writing by the department in advance of the 60-day deadline, and the system must already have initiated public education activities prior to the end of the 60-day deadline.

(4) Delivery of public education at an NTNC system. Within 60 days of the date of notification of the action level exceedance, an NTNC system shall deliver the public education materials specified as follows:

1. 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

2. Distribute informational pamphlets or brochures on lead in drinking water to each person served by the nontransient noncommunity water system. The department may allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as at least the same coverage is achieved. If the system serves children 18 years of age and under, such as a school or child care facility, the public education notice must be provided to the parents or legal guardians of the children.

For systems that are required to conduct monitoring annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs or, if the department has established an alternate monitoring period, the last day of that period.

(5) Continuing public education at an NTNC system. An NTNC system shall repeat the tasks contained in 42.2(2)*"b"*(4) at least once during each calendar year in which the system exceeds the lead action level. The department can allow activities in 42.2(2)*"b"*(4) to extend beyond the 60-day requirement if needed for implementation purposes on a case-by-case basis; however, this extension must be approved in writing by the department in advance of the 60-day deadline, and the system must already have initiated public education activities prior to the end of the 60-day deadline.

(6) Discontinuation of public education activities. A CWS or NTNC 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 567—paragraph 41.4(1)*"c."* Such system shall recommence public education in accordance with 42.2(2) if the system subsequently exceeds the lead action level during any monitoring period.

(7) Special population CWS allowance. A CWS that meets the following criteria may apply to the department in writing for reduced public education and notification requirements:

1. The CWS is a facility, such as a prison or 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

2. The CWS provides water as part of the cost of services provided and does not separately charge for water consumption.

If the department approves the request in writing, the CWS is not required to include the language in 42.2(2)*"a"*(7) and must deliver the public education in accordance with 42.2(2)*"b"*(4) and (5), in lieu of 42.2(2)*"b"*(2) and (3).

(8) CWS serving 3,300 or fewer people. A CWS serving 3,300 or fewer people may limit certain aspects of its public education programs as follows:

1. The system must implement at least one of the activities listed in 42.2(2)*"b"*(2)"8."

2. The system may limit the distribution of the public education materials in 42.2(2)*"b"*(2)"2" and "3" to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children.

3. The department may waive the requirements of 42.2(2)*"b"*(2)"7" for the system provided the system distributes notices to every household served by the system.

c. 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 567—paragraph 41.4(1)*"c"* 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 itself required to collect and analyze the sample.

ITEM 42. Adopt the following **new** subparagraph **42.3(3)"b"(6)**:

(6) A report that contains information regarding a Level 1 or Level 2 assessment required under 567—subrule 41.2(1) must include the applicable definitions:

1. "Level 1 Assessment" is a study of the water system to identify potential problems and determine (if possible) why total coliform bacteria have been found in our water system.

2. "Level 2 Assessment" is a very detailed study of the water system to identify potential problems and determine (if possible) why an *E. coli* MCL violation has occurred or why total coliform bacteria have been found in our water system on multiple occasions.

ITEM 43. Rescind and reserve numbered paragraph **42.3(3)"c"(1)"6."**

ITEM 44. Amend numbered paragraph **42.3(3)"c"(1)"7"** as follows:

7. For ~~fecal coliform~~ *E. coli* analytical results under 567—subrule 41.2(1), the total number of positive samples.

ITEM 45. Amend subparagraph **42.3(3)"f"(3)** as follows:

(3) In order to ensure that tap water is safe to drink, the department prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. The United States Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public ~~heath~~ health.

ITEM 46. Amend subparagraph **42.3(3)"g"(5)** as follows:

(5) ~~Lead 95th percentile levels above the action level (0.015 mg/L). Systems which detect lead above the action level in more than 5 percent (95th percentile) and up to and including 10 percent (90th percentile) of homes sampled.~~ Lead information statement for all CWS. Every report must include the following lead-specific information:

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).~~ A short informational statement about lead in drinking water and the effects it has on children. The statement must include the following information:

"If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from material and components associated with service lines and home plumbing. [*insert name of system*] is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (800)426-4791 or at www.epa.gov/safewater/lead."

2. ~~May~~ A system may write its own educational statement, but only in consultation with the department.

ITEM 47. Amend paragraph **42.3(3)"h"** as follows:

h. Additional mandatory report requirements.

(1) to (4) No change.

(5) Systems required to comply with 567—41.7(455B), the groundwater rule, must include the following when applicable:

1. Any groundwater system that receives notice from the department of a significant deficiency must inform its customers of any significant deficiency that is uncorrected at the time of the next report.

The system must continue to inform the public annually until the department determines that particular significant deficiency is corrected. Each report must include the following elements:

- The nature of the particular significant deficiency and the date the significant deficiency was identified by the department; and
- For each significant deficiency, the department-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed.

Only if directed by the department, a system with significant deficiencies that have been corrected before the next report is issued must inform its customers of the significant deficiency, how the deficiency was corrected, and the date of correction.

2. Any groundwater system that receives notice from the department or laboratory of a fecal indicator-positive groundwater source sample that is not invalidated by the department under 567—paragraph 41.7(3)*"d"* must inform its customers of any fecal indicator-positive groundwater source sample in the next report. The system must continue to inform the public annually until the department determines that the fecal contamination in the groundwater source is addressed under 567—paragraph 41.7(4)*"a."* Each report must include the following elements:

- The source of the fecal contamination (if the source is known) and the dates of the fecal indicator-positive groundwater source samples;
- Whether the fecal contamination in the groundwater source has been addressed under 567—paragraph 41.7(4)*"a"* and the date of such action;
- For each fecal contamination in the groundwater source that has not been addressed under 567—paragraph 41.7(4)*"a,"* the department-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed; and
- If the system receives notice of a fecal indicator-positive groundwater source sample that is not invalidated by the department under 567—paragraph 41.7(3)*"d,"* the potential health effects, using the "Fecal coliform or *E. coli*" or "Fecal Indicators (enterococci or coliphage)" health effects language of Appendix C in Chapter 42.

(6) Pursuant to 567—subrule 41.2(1), any system required to comply with the Level 1 assessment requirement or a Level 2 assessment requirement that is not due to an *E. coli* MCL violation must include in the report the text in 42.3(3)*"h"*(6)"1" to "3" as appropriate, filling in the blanks accordingly and including the text found in the bulleted paragraphs of 42.3(3)*"h"*(6)"4" if appropriate.

1. Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that the potential pathway exists through which contamination may enter the drinking water distribution system. We found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessment(s) to identify problems and to correct any problems that were found during these assessments.

2. During the past year, we were required to conduct [*insert number of required Level 1 assessments*] Level 1 assessment(s). [*insert number of completed Level 1 assessments*] Level 1 assessment(s) were completed. In addition, we were required to take [*insert number of required corrective actions*] corrective actions, and we completed [*insert number of completed corrective actions*] of these actions.

3. During the past year, [*insert number of required Level 2 assessments*] Level 2 assessments were required to be completed for our water system. [*insert number of completed Level 2 assessments*] Level 2 assessment(s) were completed. In addition, we were required to take [*insert number of required corrective actions*] corrective actions, and we completed [*insert number of completed corrective actions*] of these actions.

4. Any system that has failed to complete all the required assessments or correct all identified sanitary defects is in violation of the treatment technique requirement and must also include one or both of the following statements, as appropriate:

- During the past year, we failed to conduct all of the required assessment(s).
- During the past year, we failed to correct all identified defects that were found during the assessment.

(7) Pursuant to 567—subrule 41.2(1), any system required to conduct a Level 2 assessment due to an *E. coli* MCL violation must include in the report the text in 42.3(3)*"h"*(7)"1" and "2" as appropriate, filling in the blanks accordingly and including the text found in the bulleted paragraphs of 42.3(3)*"h"*(7)"3" if appropriate.

1. *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems. We found *E. coli* bacteria, indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessment(s) to identify problems and to correct any problems that were found during these assessments.

2. We were required to complete a Level 2 assessment because we found *E. coli* bacteria in our water system. In addition, we were required to take [*insert number of required corrective actions*] corrective actions and we completed [*insert number of completed corrective actions*] of these actions.

3. Any system that has failed to complete the required assessment or correct all identified sanitary defects is in violation of the treatment technique requirement and must also include one or both of the following statements, as appropriate:

- We failed to conduct the required assessment.
- We failed to correct all sanitary defects that were identified during the assessment that we conducted.

(8) Pursuant to 567—subrule 41.2(1), if a system detects *E. coli* and violated the *E. coli* MCL, in addition to completing the table as required in 42.3(3)*"c,"* the system must include one or more of the following statements to describe any noncompliance, as applicable:

1. We had an *E. coli*-positive repeat sample following a total coliform-positive routine sample.
2. We had a total coliform-positive repeat sample following an *E. coli*-positive routine sample.
3. We failed to take all required repeat samples following an *E. coli*-positive routine sample.
4. We failed to test for *E. coli* when any repeat sample tested positive for total coliform.

(9) Pursuant to 567—subrule 41.2(1), if a system detects *E. coli* and has not violated the *E. coli* MCL, in addition to completing the table as required in 42.3(3)*"c,"* the system may include a statement that explains that although the system has detected *E. coli*, the system is not in violation of the *E. coli* MCL.

ITEM 48. Amend paragraph **42.3(4)"c,"** introductory paragraph, as follows:

c. Waiver from mailing requirements for systems serving fewer than 10,000 persons. All community public water supply systems with fewer than 10,000 persons served will be granted the waiver, except for those systems which have the following: one or more exceedances of a maximum contaminant level, treatment technique, action level, or health advisory; an administrative order; a court order; significant noncompliance with monitoring or reporting requirements; or an extended compliance schedule contained in the operation permit. Even though a public water supply system has been granted a mailing waiver, subparagraphs 42.3(4)*"a"*(2) ~~to (4)~~ and (3) and paragraph 42.3(4)*"b"* still apply to all community public water supply systems. A mailing waiver is not allowed for the report covering the year during which one of the previously listed exceptions occurred. Systems which use the mailing waiver must:

ITEM 49. Amend paragraph **42.3(4)"d"** as follows:

d. Waiver from mailing requirements for systems serving 500 or fewer in population. All community public water supply systems serving 500 or fewer persons will be granted the waiver, except for those systems which have the following: one or more exceedances of a maximum contaminant level, treatment technique, action level, or health advisory; an administrative order; a court order; significant noncompliance with monitoring or reporting requirements; or an extended compliance schedule contained in the operation permit. Systems serving 500 or fewer persons which use the waiver may forego the requirements of subparagraphs 42.3(4)*"c"*(1) and (2) if they provide notice at least once per year to their customers by mail, door-to-door delivery, or by posting that the report is

available upon request, in conspicuous places within the area served by the system acceptable to the department. A mailing waiver is not allowed for the report covering the year during which one of the previously listed exceptions occurred. Even though a public water supply system has been granted a mailing waiver, subparagraphs 42.3(4)*"a"*(2) ~~to (4)~~ and (3) and paragraph 42.3(4)*"b"* still apply to all community public water supply systems.

ITEM 50. Adopt the following **new** paragraph **42.4(1)"d"**:

d. Groundwater rule. Additional reporting requirements for the groundwater rule are listed in 567—paragraph 41.7(6)*"a."*

ITEM 51. Adopt the following **new** paragraph **42.4(1)"e"**:

e. Coliform rule. Additional reporting requirements for the coliform rule are listed in 567—paragraph 41.2(1)*"n."*

ITEM 52. Amend subparagraph **42.4(2)"a"(1)**, introductory paragraph, as follows:

(1) Except as provided in 42.4(2)*"a"*(1)"8," a water system shall report the information specified below for all tap water samples specified in 567—paragraph 41.4(1)*"c"* and for all water quality parameter samples specified in 567—paragraph 41.4(1)*"d"* within the first ten days following the end of each applicable monitoring period specified in 567—41.4(455B) (i.e., every six months, annually, or every three years). For monitoring periods with a duration of less than six months, the end of the monitoring period is the last date samples can be collected during that period as specified in 567—paragraphs 41.4(1)*"c"* and 41.4(1)*"d."*

ITEM 53. Amend subparagraph **42.4(2)"a"(2)**, introductory paragraph, as follows:

(2) Certain systems that do not have enough taps that can provide first-draw samples that have met the six-hour stand time criteria, such as an NTNC that has 24-hour operation or a CWS that meets the criteria of ~~42.2(4)*"g"*(1) and (2)~~ 42.2(2)*"b"*(7), must either:

ITEM 54. Amend subparagraph **42.4(2)"a"(3)** as follows:

(3) ~~No later than 60 days after the addition of a new source or any change in water treatment, unless the department specifies earlier notification~~ At a time specified by the department or, if no specific time is designated by the department, then as early as possible prior to the addition of a new source or any long-term change in water treatment, a water system that has optimized corrosion control under 567—subparagraph 43.7(1)*"b"*(3), a water system subject to reduced monitoring pursuant to 567—paragraph 41.4(1)*"c"*(4)"4," or a water system subject to a monitoring waiver pursuant to 567—subparagraph 41.4(1)*"c"*(7)~~,~~ shall send written documentation to the department describing the change or addition. The department must review and approve the addition of a new source or long-term change in treatment before it is implemented by the water system. Examples of long-term treatment changes include the addition of a new treatment process or modification of an existing treatment process. Examples of modifications include the switching of secondary disinfectants, switching of coagulants (e.g., alum to ferric chloride), and switching of corrosion inhibitor products (e.g., orthophosphate to blended phosphate). Long-term changes can include dose changes to existing chemicals if the system is planning long-term changes to its finished water pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily water quality changes. In those instances where prior department approval of the treatment change or new source is not required, water systems are encouraged to provide the notification to the department beforehand to minimize the risk that the treatment change or new source will adversely affect optimal corrosion control.

ITEM 55. Amend subparagraph **42.4(2)"e"(1)** as follows:

(1) ~~Within~~ No later than 12 months after the end of a monitoring period in which a system exceeds the lead action level in sampling referred to in 567—paragraph 43.7(4)*"a,"* the system ~~shall demonstrate in writing~~ must submit to the department ~~that it has conducted a materials evaluation, including~~ written documentation of the material evaluation pursuant to 567—subparagraph 41.4(1)*"c"*(1), ~~to~~ identify the initial number of lead service lines in its distribution system at the time the system exceeds the lead

action level, and ~~shall~~ provide the department with the system's schedule for replacing annually at least 7 percent of the initial number of lead service lines in its distribution system.

ITEM 56. Amend subparagraph **42.4(2)"e"(2)** as follows:

(2) ~~Within~~ No later than 12 months after the end of a monitoring period in which a system exceeds the lead action level in sampling referred to in 567—paragraph 43.7(4)*"a"* and every 12 months thereafter, the system shall demonstrate in writing that the system has either:

1. 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 department under 567—paragraph 43.7(4)*"e"* in its distribution system), or

2. Conducted sampling which demonstrates that the lead concentration in all service line samples from individual line(s), taken pursuant to 567—paragraph 41.4(1)*"c"*(2)"3," is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced and those lines which meet the criteria in 567—paragraph 43.7(4)*"c"* shall equal at least 7 percent of the initial number of lead lines identified under ~~567—paragraph 43.7(4)*"b"*~~ 42.4(2)*"e"*(1) or the percentage specified by the department under 567—paragraph 43.7(4)*"e."* A lead service line meeting the criteria of 567—paragraph 43.7(4)*"c"* may only be used to comply with the 7 percent criteria for a specific year, and may not be used again to calculate compliance with the 7 percent criteria in future years.

ITEM 57. Amend paragraph **42.4(2)"f"** as follows:

f. Public education program reporting requirements.

(1) Any water system that is subject to the public education requirements in ~~567—42.2(455B)~~ 42.2(2) shall, within ten days after the end of each period in which the system is required to perform public education ~~tasks~~ in accordance ~~within 42.2(4),~~ with 42.2(2)*"b,"* send written documentation to the department that contains:

1. A demonstration that the system has delivered the public education materials that meet the content requirements in ~~42.2(2) and 42.2(3)~~ 42.2(2)*"a"* and the delivery requirements in ~~42.2(4)~~ 42.2(2)*"b"*; and

2. A list of all the newspapers, radio stations, television stations, 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 department, a system that previously has submitted the information required by 42.4(2)*"f"*(1)"2" need not resubmit the same information, provided there have been no changes in the distribution list and the system certifies that the public education materials were distributed to the same list previously submitted. The certification is due within ten days after the end of each period in which the system is required to perform public education.

(3) No later than three months following the end of the monitoring period, each system must mail a sample copy of the consumer notification of tap results to the department along with a certification that the notification has been distributed in a manner consistent with the requirements of 42.2(1).

ITEM 58. Amend subparagraph **42.4(3)"a"(1)** as follows:

(1) Applicability. Monthly records of operation shall be completed by all public water supplies, on forms provided by the department or on similar forms, unless a public water supply meets all of the following conditions:

1. and 2. No change.

3. Does not utilize either a surface water or a groundwater under the direct influence of surface water either in whole or in part as a water source~~.~~;

4. Does not use a treatment technique such as blending to achieve compliance with a maximum contaminant level, treatment technique, action level, or health advisory.

The reports shall be completed as described in 42.4(3)*"a"*(2) and maintained at the facility for inspection by the department for a period of five years. For CWS and NTNC PWSs, the monthly operation report must be signed by the certified operator in charge. For TNC PWSs, the monthly operation report, if required by the department, must be signed by the owner or the owner's designee.

All public water supplies using a surface water or influenced groundwater source must also comply with the applicable record-keeping requirements in 567—43.5(455B), 567—43.9(455B), ~~and~~ 567—43.10(455B), and 567—43.11(455B).

ITEM 59. Amend paragraph **42.4(3)"b,"** introductory paragraph, as follows:

b. Chemical quality and application. Any drinking water system chemical which is added to raw, partially treated, or finished water must be suitable for the intended use in a potable water system. Effective on October 1, 2000, the chemical must be certified ~~to meet the current~~ by an American National Standards Institute (ANSI) accredited third party for conformance with American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 60, if such certification exists for the particular product, unless certified chemicals are not reasonably available for use, in accordance with guidelines provided by the department. If the chemical is not certified ~~by~~ to meet the ANSI/NSF Standard 60 or no certification is available, the person seeking to supply or use the chemical must prove to the satisfaction of the department that the chemical is not toxic or otherwise a potential hazard in a potable public water supply system.

ITEM 60. Amend subparagraph **42.4(3)"b"(1)** as follows:

(1) Continuous disinfection.

1. When required. Continuous disinfection must be provided at all public water supply systems, except for the following: groundwater supplies that have no treatment facilities or have only fluoride, sodium hydroxide or soda ash addition and that meet the bacterial standards as provided in ~~567—41.2(455B)~~ 567—subrule 41.2(1) and do not show other actual or potential hazardous contamination by microorganisms. For a noncommunity system that only uses a cation-exchange softening unit that meets the requirements of 42.3(4)*"a"*(7), the requirement for continuous disinfection is based upon the system's history of both coliform bacteria detection and compliance with the coliform bacteria monitoring requirements as provided in 567—subrule 41.2(1).

2. No change.

3. Chlorine residual. A minimum free available chlorine residual of 0.3 mg/L or a minimum total available chlorine residual of 1.5 mg/L must be continuously maintained throughout the water distribution system, except for those points in the distribution system that terminate as dead ends or areas that represent very low use when compared to usage throughout the rest of the distribution system as determined by the department. All systems using water to which chlorine has been added must monitor daily in the distribution system to ensure the minimum disinfectant residual concentration is met, including both wholesale systems and consecutive systems.

4. to 6. No change.

ITEM 61. Amend subparagraph **42.4(3)"c"(2)** as follows:

(2) Disinfection information specified in 567—subrule 43.5(2) and paragraph 42.4(3)*"b"* must be reported to the department within ten days after the end of each month the system serves water to the public. Information that must be reported includes:

1. and 2. No change.

3. The information on the samples taken in the distribution system in conjunction with total coliform monitoring listed in 567—paragraph 43.5(2)*"d"* and pursuant to ~~567—paragraph 41.2(1)*"c."*~~ 567—subparagraph 41.2(1)*"c"*(7).

ITEM 62. Adopt the following **new** subparagraph **42.4(3)"c"(3)**:

(3) Total inactivation ratio. The total inactivation ratio must be calculated each day the treatment plant is in operation, pursuant to 567—paragraph 43.5(2)*"a,"* and reported on the monthly operation report. If the total inactivation ratio is below 1.0, the system must notify the department within 24 hours.

ITEM 63. Amend subparagraph **42.4(3)"d"(3)**, introductory paragraph, as follows:

(3) Disinfectants. In addition to the requirements in 567—subparagraph ~~41.2(1)*"c"*(2)~~ 41.2(1)*"c"*(7), systems must report the information specified in the following table:

ITEM 64. Adopt the following **new** paragraph **42.5(1)"i"**:

i. Groundwater rule. Additional record-keeping requirements for the groundwater rule are listed in 567—paragraph 41.7(6)*"b."*

ITEM 65. Adopt the following **new** paragraph **42.5(1)"j"**:

j. Level 1 and 2 assessment forms and corrective action. These record-keeping requirements pertain to the coliform bacteria requirements in 567—subrule 41.2(1).

(1) The system must maintain any assessment form, regardless of who conducts the assessment, and documentation of corrective actions completed as a result of those assessments, or other available summary documentation of the sanitary defects and corrective actions taken under 567—paragraph 41.2(1)*"m"* for department review. This record must be maintained by the system for a period not less than five years after completion of the assessment or corrective action.

(2) The system must maintain a record of any repeat sample taken that meets department criteria for an extension of the 24-hour period for collecting repeat samples as provided for under 567—paragraph 41.2(1)*"j."*

ITEM 66. Rescind the "Microbiological Contaminants" section of **567—Chapter 42**, Appendix A, and adopt the following **new** section in lieu thereof:

Contaminant	Standard Health Effects Language
Microbiological Contaminants	
Coliform assessment and/or corrective action violations, under 567—subrule 41.2(1)	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system. We found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessments to identify problems and to correct any problems that are found. [THE SYSTEM MUST INCLUDE THE FOLLOWING APPLICABLE SENTENCES] ● We failed to conduct the required assessment. ● We failed to correct all identified sanitary defects that were found during the assessment(s).
E. coli	*E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems.
E. coli assessment and/or corrective action violations, under 567—subrule 41.2(1)	*E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems. We violated the standard for *E. coli*, indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct a detailed assessment to identify problems and to correct any problems that are found. [THE SYSTEM MUST INCLUDE THE FOLLOWING APPLICABLE SENTENCES] ● We failed to conduct the required assessment. ● We failed to correct all identified sanitary defects that were found during the assessment(s).
Seasonal system treatment technique violation	● When this violation includes the failure to monitor for total coliforms or *E. coli* prior to serving water to the public, the mandatory language for monitoring violation in 42.1(5)*"c"*(2) must be used.

Contaminant	Standard Health Effects Language
	• When this violation includes failure to complete other actions, the appropriate elements found in 42.1(5)*"c"* to describe the violation must be used.
Fecal indicators for the groundwater rule (*E. coli*, enterococci, and coliphage)	Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

ITEM 67. Adopt the following **new** "Groundwater Treatment Technique Requirements" section in **567—Chapter 42**, Appendix A, after "Microbiological Contaminants" section:

Contaminant	Standard Health Effects Language
Groundwater Treatment Technique Requirements	
Groundwater rule treatment technique violations	Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.

ITEM 68. Rescind the "Bacteria" section of **567—Chapter 42**, Appendix C, and adopt the following **new** "Microbiological Contaminants" section in lieu thereof:

Contaminant (CCR units)	MCL, in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major sources in drinking water	Health effects language
Microbiological Contaminants						
Total coliform bacteria	TT		TT	n/a	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, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system.
E. coli	Routine and repeat samples are total coliform-positive and either is *E. coli*-positive, or system fails to take repeat samples following *E. coli*-positive routine sample, or system fails to analyze total coliform-positive repeat sample for *E. coli*		Routine and repeat samples are total coliform-positive and either is *E. coli*-positive, or system fails to take repeat samples following *E. coli*-positive routine sample, or system fails to analyze total coliform-positive repeat sample for *E. coli*	0	Human and animal fecal waste	*E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely compromised immune systems.
Fecal indicators (enterococci or coliphage)	TT		TT	n/a	Human and animal fecal waste	Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

ITEM 69. Amend subrule 43.1(7) as follows:

43.1(7) *Sanitary surveys.* Each public water supply system must have a periodic sanitary survey, conducted by the department or its designee, which is a records review and on-site inspection of the system. Systems must provide the department, at its request, any existing information that will enable the department to conduct the sanitary survey. The inspection evaluates the system's ability to produce and distribute safe drinking water and identifies improvements necessary to maintain or improve drinking water quality. The sanitary survey includes review and inspection of the following areas: water source; treatment facilities ~~(treatment, storage, distribution system)~~; distribution system; finished water storage; pumps, pump facilities, controls and other equipment; monitoring, reporting, and data verification, including self-monitoring requirements; system operation and management; maintenance; ~~self-monitoring requirements;~~ properly certified operators; and records. A report of the sanitary survey is issued by the department or its designee, and may include both enforceable required actions for remedying significant deficiencies and nonenforceable recommended actions. The frequency of the sanitary survey inspection must be at least once every five years for noncommunity systems~~,~~ and once every ~~five~~ three years for community systems ~~using groundwater, and once every three years for community systems using surface water or influenced groundwater sources~~. The department or its designee must provide the system with a written notice describing any significant deficiencies identified no later than 30 days after the department identifies the significant deficiency. The notice may be included in the sanitary survey report and may specify corrective actions and deadlines for completion of corrective actions. Systems must respond in writing to significant deficiencies outlined in the sanitary survey report or written notice within the time period specified in the report, indicating how and on what schedule the system will address significant deficiencies noted in the survey. At a maximum, the written response must be received within ~~45~~ 30 days of receiving the survey report. All systems must take the steps necessary to address significant deficiencies identified in the sanitary survey report that are within the control of the system and its governing body.

ITEM 70. Amend paragraph **43.3(2)"a,"** introductory paragraph, as follows:

a. The standards for a project are the Ten States Standards as adopted through ~~2007~~ 2012 and the American Water Works Association (AWWA) Standards as adopted through ~~2010~~ 2016 and 43.3(7) to 43.3(9). To the extent of any conflict between the Ten States Standards and the American Water Works Association Standards and 43.3(7) to 43.3(9), the Ten States Standards, 43.3(2), and 43.3(7) to 43.3(9) shall prevail. Additional standards include the following:

ITEM 71. Amend subparagraph **43.3(7)"c"(2)** as follows:

(2) Groundwater sources. Water samples collected from groundwater sources in accordance with 43.3(7)*"c"*(1) shall be conducted at the conclusion of the drawdown/yield test pumping procedure, with the exception of bacteriological monitoring. Bacteriological monitoring must be conducted after disinfection of each new well and subsequent pumping of the chlorinated water to waste. Water samples must be analyzed for ammonia. Water samples should also be analyzed for alkalinity, ~~ammonia,~~ pH, calcium, chloride, copper, hardness, iron, magnesium, manganese, potassium, silica, specific conductance, sodium, sulfate, filterable and nonfilterable solids, and zinc.

ITEM 72. Amend subparagraph **43.3(7)"c"(3)** as follows:

(3) Surface water sources. Water samples collected from surface water sources in accordance with 43.3(7)*"c"*(1) should be collected prior to the design of the surface water treatment facility and shall be conducted and analyzed prior to utilization of the source. The samples shall be collected during June, July, and August. In addition, quarterly monitoring shall be conducted in March, June, September, and December at a location representative of the raw water at its point of withdrawal. Monitoring shall be for turbidity, alkalinity, pH, calcium, chloride, color, copper, hardness, iron, magnesium, manganese, potassium, silica, specific conductance, sodium, sulfate, filterable and nonfilterable solids, carbonate, bicarbonate, algae (qualitative and quantitative), total organic carbon, five-day biochemical oxygen demand, dissolved oxygen, surfactants, nitrogen series (organic, ammonia, nitrite, and nitrate), and phosphate.

TABLE A: SEPARATION DISTANCES

SOURCE OF CONTAMINATION	REQUIRED MINIMUM LATERAL DISTANCE FROM WELL AS HORIZONTAL ON THE GROUND SURFACE, IN FEET	
	Deep Well[1]	Shallow Well[1]
WASTEWATER STRUCTURES:		
Point of Discharge to Ground Surface		
Sanitary & industrial discharges	400	400
Water treatment plant wastes	50	50
Well house floor drains	5	5
Sewers & Drains[2]		
Sanitary & storm sewers, drains	0 – 25 feet: prohibited 25 – 75 feet if water main pipe 75 – 200 feet if sanitary sewer pipe	0 – 25 feet: prohibited 25 – 75 feet if water main pipe 75 – 200 feet if sanitary sewer main pipe
Sewer force mains	0 – 75 feet: prohibited 75 – 400 feet if water main pipe 400 – 1000 feet if ~~water main or~~ sanitary sewer pipe	0 – 75 feet: prohibited 75 – 400 feet if water main pipe 400 – 1000 feet if ~~water main or~~ sanitary sewer main pipe
Water plant treatment process wastes that are treated onsite	0 – 5 feet: prohibited 5 – 50 feet if sanitary sewer pipe	0 – 5 feet: prohibited 5 – 50 feet if sanitary sewer main pipe
Water plant wastes to sanitary sewer	0 – 25 feet: prohibited 25 – 75 feet if water main pipe 75 – 200 feet if sanitary sewer pipe	0 – 25 feet: prohibited 25 – 75 feet if water main pipe 75 – 200 feet if sanitary sewer main pipe
Well house floor drains to sewers	0 – 25 feet: prohibited 25 – 75 feet if water main pipe 75 – 200 feet if sanitary sewer pipe	0 – 25 feet: prohibited 25 – 75 feet if water main pipe 75 – 200 feet if sanitary sewer main pipe
Well house floor drains to surface	0 – 5 feet: prohibited 5 – 50 feet if sanitary sewer pipe	0 – 5 feet: prohibited 5 – 50 feet if sanitary sewer main pipe
Land Disposal of Treated Wastes		
Irrigation of wastewater	200	400
Land application of solid wastes[3]	200	400
Other		
Cesspools & earth pit privies	200	400
Concrete vaults & septic tanks	100	200
Lagoons	400	1000
Mechanical wastewater treatment plants	200	400
Soil absorption fields	200	400
CHEMICALS:		
Chemical application to ground surface	100	200
Chemical & mineral storage above ground	100	200
Chemical & mineral storage on or under ground	200	400
Transmission pipelines (such as fertilizer, liquid petroleum, or anhydrous ammonia)	200	400
ANIMALS:		
Animal pasturage	50	50

SOURCE OF CONTAMINATION	REQUIRED MINIMUM LATERAL DISTANCE FROM WELL AS HORIZONTAL ON THE GROUND SURFACE, IN FEET	
	Deep Well[1]	Shallow Well[1]
Animal enclosure	200	400
Earthen silage storage trench or pit	100	200
Animal Wastes		
Land application of liquid or slurry	200	400
Land application of solids	200	400
Solids stockpile	200	400
Storage basin or lagoon	400	1000
Storage tank	200	400
MISCELLANEOUS:		
Basements, pits, sumps	10	10
Cemeteries	200	200
Cisterns	50	100
Flowing streams or other surface water bodies	50	50
GHEX loop boreholes	200	200
Railroads	100	200
Private wells	200	400
Solid waste landfills and disposal sites[4]	1000	1000

[1]Deep and shallow wells, as defined in 567—40.2(455B): A deep well is a well located and constructed in such a manner that there is a continuous layer of low permeability soil or rock at least 5 feet thick located at least 25 feet below the normal ground surface and above the aquifer from which water is to be drawn. A shallow well is a well located and constructed in such a manner that there is not a continuous layer of low permeability soil or rock (or equivalent retarding mechanism acceptable to the department) at least 5 feet thick, the top of which is located at least 25 feet below the normal ground surface and above the aquifer from which water is to be drawn.

[2]The separation distances are dependent upon two factors: the type of piping that is in the existing sewer or drain, as noted in the table, and that the piping was properly installed in accordance with the standards.

[3]Solid wastes are those derived from the treatment of water or wastewater. Certain types of solid wastes from water treatment processes may be land-applied within the separation distance on an individual, case-by-case basis.

[4]Solid waste means garbage, refuse, rubbish, and other similar discarded solid or semisolid materials, including but not limited to such materials resulting from industrial, commercial, agricultural, and domestic activities.

ITEM 73. Amend subrule 43.3(8) as follows:

43.3(8) *Drinking water system components.* Any drinking water system component which comes into contact with raw, partially treated, or finished water must be suitable for the intended use in a potable water system. The component must ~~meet the current~~ be certified by an American National Standards Institute (ANSI) accredited third party for conformance with American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61 specifications, if such specification exists for the particular product, unless approved components are not reasonably available for use, in accordance with guidance provided by the department. If the component does not meet the ANSI/NSF Standard 61 specifications or no specification is available, the person seeking to supply or use the component must prove to the satisfaction of the department that the component is not toxic or otherwise a potential hazard in a potable public water supply system.

ITEM 74. Amend subparagraph **43.3(10)"b"(1)**, introductory paragraph, as follows:

(1) Inorganic compounds. The department identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for the inorganic contaminants listed in 567—paragraph 41.3(1)*"b,"* except ~~arsenic and~~ fluoride.

ITEM 75. Amend paragraph **43.5(2)"a"** as follows:

a. Disinfection treatment criteria. 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 or removal of *Giardia lamblia* cysts and at least 99.99 percent (4-log) inactivation or removal of viruses, acceptable to the department. At least 0.5 log inactivation of *Giardia lamblia* cysts must be achieved through disinfection treatment using a chemical disinfectant even if the required inactivation or removal is met or exceeded through physical treatment processes. Each system is required to calculate the total inactivation ratio ($CT_{calculated}/CT_{required}$) each day the treatment plant is in operation. The system's total inactivation ratio must be equal to or greater than 1.0 in order to ensure that the minimum inactivation and removal requirements have been achieved. If the system's total inactivation ratio for the day is below 1.0, the system must notify the department within 24 hours.

ITEM 76. Amend subparagraph **43.5(4)"a"(1)** as follows:

(1) Turbidity analytical methodology. Turbidity analysis shall be conducted using the ~~following methodology:~~ methodology in the following table. Each turbidimeter must be calibrated at least once every 90 days with a primary standard. The calibration of each turbidimeter used for compliance must be verified at least once per week with a primary standard, secondary standards, or the manufacturer's proprietary calibration confirmation device or by a method approved by the department. If the verification is not within plus or minus 0.05 NTU for measurements of less than or equal to 0.5 NTU, or within plus or minus 10 percent of measurements greater than 0.5 NTU, the turbidimeter must be recalibrated.

Methodology	Analytical Method				
	EPA	SM	GLI	HACH	Other
Nephelometric[5]	180.1[1]	2130B[2]	Method 2[3]	FilterTrak 10133[4]	
Laser Nephelometry (online)					Mitchell M5271[6]; Mitchell M5331 Rev. 1.2[10]
LED Nephelometry (online)					Mitchell M5331[7]; Mitchell M5331 Rev. 1.2[10]; AMI Turbiwell[9]
LED Nephelometry (portable)					Orion AQ4500[8]
360-degree Nephelometry					Hach Method 10258[11]

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

[2]Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992, 19th edition, 1995, ~~or~~ 20th edition, 1998, 21st edition, 2005, and 22nd edition, 2012 (any of ~~the three~~ these editions may be used), American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

[3]GLI Method 2, "Turbidity," November 2, 1992, Great Lakes Instruments, Inc., 8855 North 55th Street, Milwaukee, WI 53223.

[4]Hach FilterTrak Method 10133, "Determination of Turbidity by Laser Nephelometry," January 2000, Revision 2.0, Hach Co., P.O. Box 389, Loveland, CO 80539-0389, telephone (800)227-4224.

[5]Styrene divinyl benzene beads (e.g., AMCO-AEPA-1 or equivalent) and stabilized formazin (e.g., Hach StablCal™ or equivalent) are acceptable substitutes for formazin.

[6]Mitchell Method M5271, Revision 1.1. "Determination of Turbidity by Laser Nephelometry," March 5, 2009. Available at www.nemi.gov or from Leck Mitchell, 656 Independence Valley Drive, Grand Junction, CO 81507.

[7]Mitchell Method M5331, Revision 1.1. "Determination of Turbidity by LED Nephelometry," March 5, 2009. Available at www.nemi.gov or from Leck Mitchell, 656 Independence Valley Drive, Grand Junction, CO 81507.

[8]Orion Method AQ4500, Revision 1.0. "Determination of Turbidity by LED Nephelometry," May 8, 2009. Available at www.nemi.gov or from Thermo Scientific, 166 Cummings Center, Beverly, MA 01915, www.thermo.com.

[9]AMI Turbiwell, "Continuous Measurement of Turbidity Using a SWAN AMI Turbiwell Turbidimeter," August 2009. Available at www.nemi.gov or from Markus Bernasconi, SWAN Analytische Instrumente AG, Studbachstrasse 13, CH-8340 Hinwil, Switzerland.

[10]Mitchell Method M5331, Revision 1.2. "Determination of Turbidity by LED or Laser Nephelometry," February 2016. Available from Leck Mitchell, 656 Independence Valley Drive, Grand Junction, CO 81507.

[11]Hach Company. "Hach Method 10258 – Determination of Turbidity by 360-Degree Nephelometry," January 2016. Available at www.hach.com.

ITEM 77. Amend subparagraph **43.5(4)"a"(5)** as follows:

(5) Residual disinfectant analytical methodology. The residual disinfectant concentrations shall be determined in compliance with one of the analytical methods in the following table. Residual disinfectant concentrations for free chlorine and combined chlorine may also 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 the same. Instruments used for continuous monitoring must be ~~calibrated~~ verified with a grab sample measurement at least every ~~five~~ seven days. The analyzer concentration must be within plus or minus 0.1 mg/L or plus or minus 15 percent (whichever is larger) of the grab sample measurement. If the verification is not within this range, immediate actions must be taken to resolve the issue and another verification must be conducted.

Disinfectant Analytical Methodology

Residual	Methodology	Standard Methods[1,2]	Standard Methods Online[6]	Other
Free chlorine	Amperometric Titration	4500-Cl D	4500-Cl D-00	D1253-03[4], 08, 14
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F-00	
	DPD Colorimetric	4500-Cl G	4500-Cl G-00	Hach Method 10260[10]
	Syringaldazine (FACTS)	4500-Cl H	4500-Cl H-00	
	Online Chlorine Analyzer			EPA 334.0[7]
	Amperometric Sensor			ChloroSense[8]
	Indophenol Colorimetric			Hach Method 10241[11]
Total chlorine	Amperometric Titration	4500-Cl D	4500-Cl D-00	D1253-03[4], 08, 14
	Amperometric Titration (low-level measurement)	4500-Cl E	4500-Cl E-00	
	DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F-00	
	DPD Colorimetric	4500-Cl G	4500-Cl G-00	Hach Method 10260[10]
	Iodometric Electrode	4500-Cl I	4500-Cl I-00	
	Online Chlorine Analyzer			EPA 334.0[7]
	Amperometric Sensor			ChloroSense[8]
Chlorine dioxide	Amperometric Titration	4500-ClO_2 C	4500-$C10_2$ C-00	
	DPD Method	4500-ClO_2 D		
	Amperometric Titration	4500-ClO_2 E	4500-$C10_2$ E-00	
	Amperometric Sensor			ChlordioX Plus[9]
	Spectrophotometric			327.0, Revision 1.1[5]
Ozone	Indigo method	4500-O_3 B[3]	4500-O_3 B-97	

[1]Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992, 19th edition, 1995, ~~or~~ 20th edition, 1998, 21st edition, 2005, or 22nd edition, 2012 (any of ~~the three~~ these editions may be used), American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710. Only the 18th, 19th, and 20th editions may be used for chlorine dioxide Method 4500-ClO_2 D.

[2]Other analytical test procedures are contained within Technical Notes on Drinking Water Methods, EPA-600/R- 94-173, October 1994, which is available as NTIS PB95-104766.

[3]Standard Methods for the Examination of Water and Wastewater, 18th edition (1992), ~~and~~ 19th edition (1995), 21st edition (2005), and 22nd edition (2012) (~~either~~ any edition may be used); American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710.

[4]Annual Book of ASTM Standards, Vol. 11.01, 2004; ASTM International; any year containing the cited version of the method may be used. Copies of this method may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

[5]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," US EPA, May 2005, EPA 815-R-05-008. Available online at www.nemi.gov.

[6]Standard Methods Online is available at www.standardmethods.org. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

[7]EPA Method 334.0, "Determination of Residual Chlorine in Drinking Water Using an On-Line Chlorine Analyzer," August 2009. EPA 815-B-09-013. Available at www.nemi.gov.

[8]ChloroSense, "Measurement of Free and Total Chlorine in Drinking Water by Palintest ChloroSense," September 2009. Available at www.nemi.gov or from Palintest Ltd., 21 Kenton Lands Road, P.O. Box 18395, Erlanger, KY 41018.

[9]ChlordioX Plus. "Chlorine Dioxide and Chlorite in Drinking Water by Amperometry Using Disposable Sensors," November 2013. Available from Palintest Ltd., Jamike Avenue (Suite 100), Erlanger, KY 41018.

[10]Hach Company. "Hach Method 10260 – Determination of Chlorinated Oxidants (Free and Total) in Water Using Disposable Planar Reagent-Filled Cuvettes and Mesofluidic Channel Colorimetry," April 2013. Available at www.hach.com.

[11]Hach Company. "Hach Method 10241 – Spectophotometric Measurement of Free Chlorine in Finished Drinking Water," November 2015, Revision 1.2. Available at www.hach.com.

ITEM 78. Amend paragraph **43.5(4)"b,"** introductory paragraph, as follows:

b. Monitoring requirements. A public water system that uses a surface water source or groundwater source under the influence of surface water must monitor in accordance with this paragraph ~~or some interim requirements required by the department, until filtration is installed~~.

ITEM 79. Amend subparagraph **43.5(4)"b"(1)** as follows:

(1) Turbidity.

1. Routine turbidity monitoring requirements. Turbidity measurements as required by 43.5(3) must be performed on representative samples of the system's filtered water every four hours (or more frequently as long as measurements are recorded at equal time intervals and detailed in the turbidity protocol) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring or may monitor more frequently than every four hours if it validates the continuous measurement for accuracy on a regular basis using a ~~calibration~~ turbidity protocol approved by the department and audited for compliance during sanitary surveys. Major elements of the protocol shall include, but are not limited to: sample measurement location, method of calibration, calibration frequency, calibration standards, method of verification, verification frequency, documentation, data collection, data recording frequency, and data reporting. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the department 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 department may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the department determines that less frequent monitoring is sufficient to indicate effective filtration performance. Approval shall be

based upon documentation provided by the system, acceptable to the department and pursuant to the conditions of an operation permit.

2. Turbidity monitoring requirements for population greater than 100,000. A supplier of water serving a population or population equivalent of greater than 100,000 persons shall provide a continuous or rotating cycle turbidity monitoring and recording device or take hourly grab samples to determine compliance with 43.5(3). The system must meet the requirements in 43.5(4)*"b"*(1)"1," including the turbidity protocol.

3. Failure of the continuous turbidity monitoring equipment. 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 until the turbidimeter is repaired and back online. A system has a maximum of five working days after failure to repair the equipment or else the system is in violation. The system must notify the department within 24 hours of both when the turbidimeter was taken offline and when it was returned online.

ITEM 80. Amend numbered paragraph **43.5(4)"b"(2)"2"** as follows:

2. Residual disinfectant in the system. The residual disinfectant concentration must be measured at least daily in the distribution system. Residual disinfectant measurements that are required as part of the total coliform bacteria sample collection under ~~567—paragraph 41.2(1)*"c"*~~ 567—subparagraph 41.2(1)*"c"*(7) shall be used to satisfy this requirement on the day(s) when a bacteria sample(s) is collected. The department may allow a public water system that uses both a groundwater source and a surface water source or a groundwater source under direct influence of surface water to take residual disinfectant samples at points other than the total coliform sampling points, if these points are included as a part of the coliform sample site plan meeting the requirements of 567—paragraph 41.2(1)*"c"*(1)"1" and if the department determines that such points are representative of treated (disinfected) water quality within the distribution system. Heterotrophic plate count bacteria (HPC) may be measured in lieu of residual disinfectant concentration, using ~~Method 9215B, Pour Plate Method, Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992~~ the analytical methods specified in 567—subparagraph 41.2(3)*"e"*(1). The time from sample collection to initiation of analysis shall not exceed eight hours. ~~Samples~~ HPC samples must be kept below 10 degrees C during transit to the laboratory. All HPC samples must be analyzed by a department-certified laboratory meeting the requirements of 567—Chapter 83.

ITEM 81. Adopt the following **new** paragraph **43.5(5)"e"**:

e. Total inactivation ratio below 1.0. If the system's total inactivation ratio for the day is below 1.0, the system must notify the department within 24 hours.

ITEM 82. Amend subparagraph **43.6(1)"d"(1)** as follows:

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

Approved Methods for Residual Disinfectant Compliance Monitoring

Methodology	Standard Methods	Other Method	Residual measured[1]			
			Free Chlorine	Combined Chlorine	Total Chlorine	Chlorine Dioxide
Amperometric Titration	4500-Cl D	ASTM: D 1253-86 (96), 03, 08, 14	X	X	X	
Low Level Amperometric Titration	4500-Cl E				X	
DPD Ferrous Titrimetric	4500-Cl F		X	X	X	
DPD Colorimetric	4500-Cl G	Hach Method 10260[4]	X	X	X	
Syringaldazine (FACTS)	4500-Cl H		X			
Amperometric Sensor		ChloroSense[3]	X		X	

Methodology	Standard Methods	Other Method	Residual measured[1]			
			Free Chlorine	Combined Chlorine	Total Chlorine	Chlorine Dioxide
Online Chlorine Analyzer		EPA 334.0[2]	X		X	
Indophenol Colorimetric		Hach Method 10241[6]	X	X	X	
Iodometric Electrode	4500-Cl I				X	
DPD	4500-ClO_2 D					X
Amperometric Method II	4500-ClO_2 E					X
Lissamine Green Spectrophotometric		EPA: 327.0 Rev. 1.1				X
Amperometric Sensor		ChlordioX Plus[5]				X

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents was approved by the Director of the Federal Register on February 16, 1999, 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, 401 M Street, SW, Washington, DC 20460 (telephone: (202)260-3027); or at the Office of Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC 20408.

The following method is available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428:

Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 1996: Method D 1253-86.

The following methods are available from the American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710:

Standard Methods for the Examination of Water and Wastewater, 19th ~~and~~ (1995), 20th (1998), 21st (2005), and 22nd (2012) editions, American Public Health Association~~, 1995 and 1998, respectively (both editions are acceptable)~~: Methods: 4500-Cl D, 4500-Cl E, 4500-Cl F, 4500-Cl G, 4500-Cl H, 4500-Cl I, ~~4500-ClO_2 D,~~ 4500-ClO_2 E. Only the 19th and 20th editions may be used for the chlorine dioxide Method 4500-ClO_2 D.

The following methods are available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161 (telephone: (800)553-6847):

"Determination of Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry, Revision 1.1," USEPA, May 2005, EPA 815-R-05-008.

[1]X indicates method is approved for measuring specified residual disinfectant. 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]EPA Method 334.0, "Determination of Residual Chlorine in Drinking Water Using an On-Line Chlorine Analyzer," August 2009. EPA 815-B-09-013. Available at www.epa/gov/safewater/methods/analyticalmethods_ogwdw.html.

[3]ChloroSense, "Measurement of Free and Total Chlorine in Drinking Water by Palintest ChloroSense," September 2009. Available at www.nemi.gov or from Palintest Ltd., 21 Kenton Lands Road, P.O. Box 18395, Erlanger, KY 41018.

[4]Hach Method 10260, "Determination of Chlorinated Oxidants (Free and Total) in Water Using Disposable Planar Reagent-Filled Cuvettes and Mesofluidic Channel Colorimetry," April 2013. Available at Hach Company, P.O. Box 389, Loveland, CO 80539, or www.hach.com.

[5]ChlordioX Plus. "Chlorine Dioxide and Chlorite in Drinking Water by Amperometry Using Disposable Sensors," November 2013. Available from Palintest Ltd., Jamike Avenue (Suite 100), Erlanger, KY 41018.

[3~~4~~]Hach Company. "Hach Method 10241 – Spectrophotometric Measurement of Free Chlorine in Finished Drinking Water," November 2015, Revision 1.2. Available at www.hach.com.

ITEM 83. Amend subparagraph **43.6(2)"c"(1)** as follows:

(1) Analytical methods. Systems required to monitor disinfectant byproduct precursors must use the following methods, which must be conducted by a certified laboratory pursuant to 567—Chapter 83, unless otherwise specified.

Approved Methods for Disinfection Byproduct Precursor Monitoring[1]

Analyte	Methodology	EPA	Standard Methods	ASTM	Other
Alkalinity[6]	Titrimetric		2320B	D 1067-92B	
	Electrometric titration				I-1030-85
Bromide	Ion chromatography	300.0			
		300.1			
		317.0 Rev. 2.0			
		326.0			
				D 6581-00	
Dissolved Organic Carbon[2] (DOC)	High temperature combustion	415.3 Rev. 1.2	5310B or 5310B-00		
	Persulfate-UV or heated-persulfate oxidation	415.3 Rev. 1.2	5310C or 5310C-00		
	Wet oxidation	415.3 Rev. 1.1, 415.3 Rev. 1.2	5310D or 5310D-00		
pH[3]	Electrometric	150.1	4500-H^+-B	D 1293-84	
		150.2			
Specific Ultraviolet Absorbance (SUVA)	Calculation using DOC and UV_{254} data	415.3 Rev. 1.2			
Total Organic Carbon[4]	High temperature combustion	415.3 Rev. 1.2	5310B or 5310B-00		
	Persulfate-UV or heated-persulfate oxidation	415.3 Rev. 1.2	5310C or 5310C-00		Hach Method 10267[7]
	Wet oxidation	415.3 Rev. 1.1, 415.3 Rev. 1.2	5310D or 5310D-00		
	Ozone Oxidation				Hach Method 10261[8]
Ultraviolet Absorption at 254 nm[5]	~~UV absorption~~ Spectrophotometry	415.3 Rev. 1.1, 415.3 Rev. 1.2	5910B or 5910B-00, 11		

[1]The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents was approved by the Director of the Federal Register on February 16, 1999, 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, 401 M Street SW, Washington, DC 20460 (telephone: (202)260-3027); or at the Office of Federal Register, 800 North Capitol Street NW, Suite 700, Washington, DC 20408.

The following methods are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428:

Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 1996: Method D 1067-92B and Method D 1293-84.

Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 2001 (or any year containing the cited version): Method D 6581-00.

The following methods are available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161 (telephone: (800)553-6847):

"Determination of Inorganic Anions in Drinking Water by Ion Chromatography, Revision 1.0," EPA-600/R-98/118, 1997 (NTIS, PB98-169196): Method 300.1.

Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983, (NTIS PB84-128677): Methods 150.1 and 150.2.

Methods for the Determination of Inorganic Substances in Environmental Samples, EPA-600/R-93/100, August 1993, (NTIS PB94-121811): Method 300.0.

"Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography with the Addition of a Postcolumn Reagent for Trace Bromate Analysis, Revision 2.0," USEPA, July 2001, EPA 815-B-01-001: Method 317.0.

"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, Revision 1.0," USEPA, June 2002, EPA 815-R-03-007: Method 326.0.

"Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water, Revision 1.1," USEPA, February 2005, EPA/600/R-05/055: Method 415.3 Revision 1.1.

"Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water, Revision 1.2," USEPA, September 2009, EPA/600/R-09/122: Method 415.3 Revision 1.2.

The following methods are available from the American Public Health Association, ~~1015 Fifteenth Street NW,~~ 800 I Street, NW, Washington, DC ~~20005~~ 20001-3710:

Standard Methods for the Examination of Water and Wastewater, 19th ~~edition~~ (1995), 21st (2005), and 22nd (2012) editions, American Public Health Association~~, 1995~~: Methods: 2320B (20th edition, 1998, is also accepted for this method), 4500-H^+-B, and 5910B (22nd edition, 2012, is also accepted for this method).

Standard Methods for the Examination of Water and Wastewater, Supplement to the 19th edition (1996), 21st (2005), and 22nd editions, American Public Health Association~~, 1996~~: Methods: 5310B, 5310C, and 5310D.

For method numbers ending "-00", 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.

Method I-1030-85 is available from the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

[2]Dissolved Organic Carbon (DOC). DOC and UV_{254} samples used to determine a SUVA value must be taken at the same time and at the same location, prior to the addition of any disinfectant or oxidant by the system. Prior to analysis, DOC samples must be filtered through a 0.45 µ 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. 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 a DOC concentration of <0.5 mg/L.

[3]pH must be measured by a laboratory certified by the department to perform analysis under 567—Chapter 83; a Grade II, III or IV operator meeting the requirements of 567—Chapter 81; or any person under the supervision of a Grade II, III or IV operator meeting the requirements of 567—Chapter 81.

[4]Total Organic Carbon (TOC). 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 a 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.

[5]Ultraviolet Absorption at 254 nm (UV_{254}). DOC and UV_{254} samples used to determine a SUVA value must be taken at the same time and at the same location, prior to the addition of any disinfectant or oxidant by the system. 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 µ 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.

[6]Alkalinity must be measured by a laboratory certified by the department to perform analysis under 567—Chapter 83; a Grade II, III or IV operator meeting the requirements of 567—Chapter 81; or any person under the supervision of a Grade II, III or IV operator meeting the requirements of 567—Chapter 81. Only the listed titrimetric methods are acceptable.

[7]Hach Company. "Hach Method 10267 – Spectrophotometric Measurement of Total Organic Carbon (TOC) in Finished Drinking Water," December 2015, Revision 1.2. Available at www.hach.com.

[8]Hach Company. "Hach Method 10261 – Total Organic Carbon in Finished Drinking Water by Catalyzed Ozone Hydroxyl Radical Oxidation Infrared Analysis," December 2015, Revision 1.2. Available at www.hach.com.

ITEM 84. Amend subparagraph **43.7(1)"b"(3)** as follows:

(3) Any water system has optimized corrosion control if it submits results of tap water monitoring conducted in accordance with 567—paragraph 41.4(1)*"c"* and source water monitoring conducted in accordance with 567—paragraph 41.4(1)*"e"* that demonstrate for two consecutive six-month monitoring periods that the difference between the 90th percentile tap water lead level computed under

567—subparagraph 41.4(1)*"b"*(3) and the highest source water lead concentration is less than the practical quantitation level for lead specified in 567—paragraph 41.4(1)*"g."*

1. and 2. No change.

3. Any water system deemed to have optimized corrosion control pursuant to this paragraph shall notify the department in writing pursuant to 567—subparagraph 42.4(2)*"a"*(3) of any upcoming long-term change in treatment or the addition of a new source as described in 567—subparagraph 42.4(2)*"a"*(3). The department ~~may require any such system to conduct additional monitoring or to take other action the department deems appropriate to ensure that the system maintains minimal levels of corrosion in the distribution system~~ must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system.

4. and 5. No change.

ITEM 85. Amend subparagraph **43.7(1)"e"(1)** as follows:

(1) Step 1. The system shall conduct initial tap sampling pursuant to 567—paragraph 41.4(1)*"c"*(4)"1" and 567—subparagraph 41.4(1)*"d"*(2) until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under 567—paragraph 41.4(1)*"c"*(4)"4." A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment under 43.7(2)*"a"* within six months after the end of the monitoring period during which it exceeds one of the action levels.

ITEM 86. Amend subparagraph **43.7(1)"e"(2)** as follows:

(2) Step 2. Within 12 months after the end of the monitoring period during which a system exceeds the lead or copper action level, the department may require the system to perform corrosion control studies under 43.7(2)*"b."* If the system is not required to perform such studies, the department will specify optimal corrosion control treatment under 43.7(2)*"d"* as follows: for medium-size systems, within 18 months after the end of the monitoring period during which such system exceeds the lead or copper action level, and, for small systems, within 24 months after the end of the monitoring period during which such system exceeds the lead or copper action level.

ITEM 87. Amend subparagraph **43.7(3)"a"(1)** as follows:

(1) Step 1. A public water supply system exceeding the lead or copper action level shall complete lead and copper source water monitoring under 567—subparagraph 41.4(1)*"e"*(2) and make a written treatment recommendation to the department ~~within six months after exceeding~~ no later than 180 days after the end of the monitoring period during which the lead or copper action level was exceeded.

ITEM 88. Amend paragraph **43.7(4)"b"** as follows:

b. Lead service line replacement schedule. A public water supply 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 upon a materials evaluation, including the evaluation required under 567—subparagraph 41.4(1)*"c"*(1), and relevant legal authorities regarding the portion owned by the system such as contracts and local ordinances.

(1) The first year of lead service line replacement shall begin on the ~~date~~ first day following the end of the monitoring period in which the action level was exceeded in tap sampling referenced in 43.7(4)*"a."* If monitoring is required annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs. If the department has established an alternate monitoring period, then the end of the monitoring period will be the last day of that period.

(2) Any water system resuming a lead service line replacement program after the cessation of its lead service line replacement program as allowed by 43.7(4)*"g"* shall update its inventory of lead service lines to include those sites that were previously determined not to require replacement through the sampling provision under 43.7(4)*"c."* The system will then divide the updated number of remaining lead service lines by the number of remaining years in the program to determine the number of lines that must be replaced per year. Seven percent lead service line replacement is based on a 15-year replacement

program. For example, systems resuming lead service line replacement after previously conducting two years of replacement would divide the updated inventory by 13.

(3) For those systems that have completed a 15-year lead service line replacement program, the department will determine a schedule for replacing or retesting lines that were previously exempted through testing under 43.7(4)*"c"* from the replacement program when the system re-exceeds the action level.

ITEM 89. Amend paragraph **43.9(3)"a"** as follows:

a. Conventional filtration treatment or direct filtration.

(1) Turbidity requirement in 95 percent of samples. For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water (combined filter effluent or CFE) 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 43.5(4)*"a"*(1) and 43.5(4)*"b"*(1).

(2) Maximum turbidity level. The turbidity level of representative samples of a system's filtered water (combined filter effluent or CFE) must at no time exceed 1 NTU, measured as specified in 43.5(4)*"a"*(1) and 43.5(4)*"b"*(1). If at any time the combined filter effluent turbidity exceeds 1 NTU, either in a grab sample used for compliance or in a continuously monitored flow, the system must inform the department as soon as possible, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under 567—subparagraph 42.1(3)*"b"*(3).

(3) Systems with lime-softening treatment. A system that uses lime softening may acidify representative samples prior to analysis using a protocol approved by the department.

ITEM 90. Amend paragraph **43.9(4)"a"** as follows:

a. Monitoring requirements for systems using filtration treatment. In addition to monitoring required by 43.5(4), a public water system subject to the requirements of this rule that provides conventional filtration treatment or direct filtration must conduct continuous monitoring of turbidity for each individual filter using an approved method in 43.5(4)*"a"*(1) and must calibrate turbidimeters ~~using the procedure specified by the manufacturer~~ at least every 90 days with a primary standard. The calibration of each turbidimeter used for compliance must be verified at least once per week with a primary standard, secondary standards, or the manufacturer's proprietary calibration confirmation device or by a method approved by the department. If the verification is not within plus or minus 0.05 NTU for measurements of less than or equal to 0.5 NTU, or within plus or minus 10 percent of measurements greater than 0.5 NTU, then the turbidimeter must be recalibrated. Systems must record the results of individual filter monitoring every 15 minutes.

ITEM 91. Amend paragraph **43.9(5)"a"** as follows:

a. Turbidity. Turbidity measurements as required by 43.9(3) must be reported in a format acceptable to the department and within ten days after the end of each month that the system serves water to the public. Information that must be reported includes:

(1) The total number of filtered water (combined filter effluent or CFE) turbidity measurements taken during the month;

(2) The number and percentage of filtered water (combined filter effluent or CFE) turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in 43.9(3)*"a"* or *"b"*; and

(3) The date and value of any combined filter effluent or CFE 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 department under 43.9(3)*"b."*

(4) The dates and summary of calibration and verification of all compliance turbidimeters.

ITEM 92. Amend subparagraph **43.9(5)"b"(2)** as follows:

(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~~ anytime following 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 seven 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.

ITEM 93. Amend paragraph **43.9(5)"c"** as follows:

c. Additional reporting requirement for turbidity combined filter effluent.

(1) If at any time the turbidity exceeds 1 NTU in representative samples of filtered water (combined filter effluent or CFE) in a system using conventional filtration treatment or direct filtration, the system must consult with the department as soon as practical, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under 567—subparagraph 42.1(3)*"b"*(3).

(2) If at any time the turbidity in representative samples of filtered water (combined filter effluent or CFE) exceeds the maximum level set by the department under 43.9(3)*"b"* for filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, the system must consult with the department as soon as practical, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under 567—subparagraph 42.1(3)*"b"*(3).

ITEM 94. Amend subparagraph **43.10(4)"a"(3)** as follows:

(3) The turbidity in the combined filter effluent must never exceed 1 NTU at any time during the month. If at any time the combined filter effluent turbidity exceeds 1 NTU, either in a grab sample used for compliance or in a continuously monitored flow, the system must inform the department as soon as possible, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under 567—subparagraphs 42.1(3)*"b"*(3) and 42.1(2)*"a"*(8).

ITEM 95. Amend subparagraph **43.10(5)"a"(2)** as follows:

(2) Calibration of turbidimeters must be conducted ~~using procedures specified by the manufacturer~~ at least every 90 days with a primary standard. The calibration of each turbidimeter used for compliance must be verified at least once per week with a primary standard, secondary standards, or the manufacturer's proprietary calibration confirmation device or by a method approved by the department. If the verification is not within plus or minus 0.05 NTU for measurements of less than or equal to 0.5 NTU, or within plus or minus 10 percent of measurements greater than 0.5 NTU, the turbidimeter must be recalibrated;

ITEM 96. Amend subparagraph **43.10(6)"a"(1)** as follows:

(1) The following information must be reported in the monthly operation report to the department by the tenth day of the following month.

1. to 3. No change.

4. The dates and summary of calibration and verification of all compliance turbidimeters.

ITEM 97. Amend subparagraph **43.10(6)"b"(2)** as follows:

(2) For any filter that had two consecutive measurements taken 15 minutes apart that exceeded 1.0 NTU, the following information must be reported:

1. The filter number(s);
2. The corresponding dates; ~~and~~
3. The turbidity values that exceeded 1.0 NTU~~.~~; and
4. The cause, if known, of the exceedance.

ITEM 98. Adopt the following **new** subparagraph **43.10(6)"b"(5)**:

(5) The dates and summary of calibration and verification of all compliance turbidimeters.

ITEM 99. Amend subparagraph **43.11(3)"b"(3)** as follows:

(3) Plants operating only part of the year. Systems with surface water or influenced groundwater treatment plants that operate for only part of the year must conduct source water monitoring in accordance with this rule, but with the following modifications.

1. No change.

2. Systems with plants that operate less than six months per year and that monitor for must collect at least six samples per year for two years. The samples must be evenly spaced throughout the period the plant operates.

ITEM 100. Amend paragraph **43.11(3)"d,"** introductory paragraph, as follows:

d. Sampling locations. Systems must collect samples for each treatment plant that treats a surface water or influenced groundwater source. If multiple plants draw water from the same influent (same pipe or intake), the department may approve one set of monitoring results to be used to satisfy the requirements for those plants.

ITEM 101. Amend subparagraph **43.11(3)"e"(1)** as follows:

(1) *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.

1. ~~There are two~~ These are the approved analytical methods for *Cryptosporidium*:

- "Method 1623: *Cryptosporidium* and *Giardia* in Water by Filtration/IMS/FA," 2005, US EPA, EPA-815-R-05-002. Available at www.nemi.gov; ~~and,~~
- "Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA," 2005, US EPA, EPA-815-R-05-001. Available at www.nemi.gov; and
- "Method 1623.1: "*Cryptosporidium* and *Giardia* in Water by Filtration/Immunomagnetic Separation/Immunofluorescence Assay Microscopy," 2012, EPA-816-R-12-001. Available at www.nepis.epa.gov.

2. Using one of the ~~two~~ approved methods, the laboratory must analyze at least a 10 L sample or a packed pellet volume of at least 2 mL. Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters specified in the method, up to a packed pellet volume of at least 2 mL.

3. to 5. No change.

ITEM 102. Amend subparagraph **43.11(3)"e"(2)** as follows:

(2) *E. coli.* Systems must have the *E. coli* samples analyzed by a laboratory certified by EPA, the National Environmental Laboratory Accreditation Conference, or the department for total coliform or fecal coliform analysis in drinking water samples using the same approved *E. coli* method for the analysis of source water.

1. The approved analytical methods for the enumeration of *E. coli* in source water are shown in Table 2.

Table 2: *E. coli* Analytical Methods

Method	EPA	Standard Methods~~: 18th, 19th, and 20th editions~~	Other
Most probable number with multiple tube or multiple well[1,2]		9223 B[3] [11]	991.15[4] Colilert[3,5] Colilert-18[3,5,6]
Membrane filtration, single step[1,7,8]	1603[9]		m-ColiBlue24[10]
Membrane filtration, two step		9222D/9222G[12]	

[1]Tests must be conducted to provide organism enumeration (i.e., density). Select the appropriate configuration of tubes/filtrations and dilutions/volumes to account for the quality, consistency, and anticipated organism density in the water sample.

[2]Samples shall be enumerated by the multiple-tube or multiple-well procedure. Using multiple-tube procedures, employ an appropriate tube and dilution configuration of the sample as needed and report the Most Probable Number (MPN). Samples tested with Colilert® may be enumerated with the multiple-well procedures, Quanti-Tray®, Quanti-Tray® 2000, and the MPN calculated from the table provided by the manufacturer.

[3]These tests are collectively known as defined enzyme substrate tests, where, for example, a substrate is used to detect the enzyme beta-glucouronidase produced by *E. coli*.

[4]Association of Official Analytical Chemists, International. "Official Methods of Analysis of AOAC International, 16th Ed., Volume 1, Chapter 17, 1995. AOAC, 481 N. Frederick Ave., Suite 500, Gaithersburg, MD 20877-2417.

[5]Descriptions of the Colilert®, Colilert-18®, Quanti-Tray®, and Quanti-Tray® 2000 may be obtained from IDEXX Laboratories, Inc., 1 IDEXX Drive, Westbrook, ME 04092.

[6]Colilert-18® is an optimized formulation of the Colilert® for the determination of total coliforms and *E. coli* that provides results within 18 hours of incubation at 35 degrees C rather than the 24 hours required for the Colilert® test.

[7]The filter must be a 0.45 micron membrane filter or a membrane filter with another pore size certified by the manufacturer to fully retain organisms to be cultivated and to be free of extractables which could interfere with organism growth.

[8]When the membrane filter method has been used previously to test waters with high turbidity or large numbers of noncoliform bacteria, a parallel test should be conducted with a multiple-tube technique to demonstrate applicability and comparability of results.

[9]"Method 1603: *Escherichia coli (E. coli)* in Water by Membrane Filtration Using Modified Membrane-Thermotolerant *Escherichia coli* Agar (modified mTEC), USEPA, July 2006." US EPA, Office of Water, Washington, DC, EPA 821-R-06-011. Available at www.nepis.epa.gov.

[10]A description of the m-ColiBlue24® test, Total Coliforms and *E. coli*, is available from Hach Company, 100 Dayton Ave., Ames, IA 50010.

[11]Standard Methods for the Analysis of Water and Wastewater, 18th (1992), 19th (1995), and 20th (1998) editions, American Public Health Association. Available from APHA, 800 I Street, NW, Washington, DC 20001-3710.

[12]Standard Methods for the Examination of Water and Wastewater, 20th edition (1998). Available from APHA, 800 I Street, NW, Washington, DC 20001-3710.

2. The holding time (the time period from sample collection to initiation of analysis) shall not exceed 30 hours. The department may approve on a case-by-case basis an extension of the holding time to 48 hours, if the 30-hour holding time is not feasible. If the extension is allowed, the laboratory must use the Colilert® reagent version of the Standard Methods 9223B to conduct the analysis.

3. The samples must be maintained between 0 and 10 degrees C during storage and transit to the laboratory.

4. The following data elements must be reported for each *E. coli* analysis:

- PWSID.
- Facility ID.
- Sample collection date.
- Analytical method number.
- Method type.
- Source type (flowing stream or river; lake or reservoir; or influenced groundwater).
- Number of *E. coli* per 100 mL.
- Turbidity in NTU.

ITEM 103. Adopt the following **new** subparagraph **43.11(10)"c"(6)**:

(6) Springs and infiltration galleries. This treatment credit is not eligible for springs and infiltration galleries. Springs and infiltration galleries are eligible for credit through demonstration of performance study under 43.11(11)*"c."*

ITEM 104. Adopt the following **new** subparagraph **43.11(10)"c"(7)**:

(7) Bank filtration demonstration of performance. The department may approve *Cryptosporidium* treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this subparagraph. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in 43.11(10)*"c"*(1) to (5).

1. The study must follow a protocol approved by the department 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.

2. 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).

ITEM 105. Adopt the following **new** appendix C in **567—Chapter 43**:

APPENDIX C: CT TABLES FOR VIRUS INACTIVATION UNDER THE GROUNDWATER RULE, 567—41.7(455B)

TABLE 1: CT Values (mg-min/L) for Inactivation of Viruses by Free Chlorine, pH 6.0-9.0[1]

Inactivation Log Credit	Water Temperature, °C																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2	5.8	5.3	4.9	4.4	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	1.0	1.0	1.0	1.0	1.0
3	8.7	8.0	7.3	6.7	6.0	5.6	5.2	4.8	4.4	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0
4	11.6	10.7	9.8	8.9	8.0	7.6	7.2	6.8	6.4	6.0	5.6	5.2	4.8	4.4	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0

[1]CT values provided in the table are modified by linear interpolation between 0.5 °C increments.

TABLE 2: CT Values (mg-min/L) for Inactivation of Viruses by Free Chlorine, pH 9.1 — 10.0

Inactivation Log Credit	Water Temperature, °C					
	0.5	5	10	15	20	25
2	45	30	22	15	11	7
3	66	44	33	22	16	11
4	90	60	45	30	22	15

TABLE 3: CT Values (mg-min/L) for Inactivation of Viruses by Chlorine Dioxide, pH 6.0 - 9.0[1]

Inactivation Log Credit	Water Temperature, °C											
	1	2	3	4	5	6	7	8	9	10	11	12
2	8.4	7.7	7.0	6.3	5.6	5.3	5.0	4.8	4.5	4.2	3.9	3.6
3	25.6	23.5	21.4	19.2	17.1	16.2	15.4	14.5	13.7	12.8	12.0	11.1
4	50.1	45.9	41.8	37.6	33.4	31.7	30.1	28.4	26.8	25.1	23.4	21.7

[1]CT values provided in the table are modified by linear interpolation between 0.5 °C increments.

Inactivation Log Credit	Water Temperature, °C												
	13	14	15	16	17	18	19	20	21	22	23	24	25
2	3.4	3.1	2.8	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.5	1.4
3	10.3	9.4	8.6	8.2	7.7	7.3	6.8	6.4	6.0	5.6	5.1	4.7	4.3
4	20.1	18.4	16.7	15.9	15.0	14.2	13.3	12.5	11.7	10.9	10.0	9.2	8.4

[1]CT values provided in the table are modified by linear interpolation between 0.5 °C increments.

TABLE 4: CT Values (mg-min/L) for Inactivation of Viruses by Ozone[1]

Inactivation Log Credit	Water Temperature, °C											
	1	2	3	4	5	6	7	8	9	10	11	12
2	0.90	0.83	0.75	0.68	0.60	0.58	0.56	0.54	0.52	0.50	0.46	0.42
3	1.40	1.28	1.15	1.03	0.90	0.88	0.86	0.84	0.82	0.80	0.74	0.68
4	1.80	1.65	1.50	1.35	1.20	1.16	1.12	1.08	1.04	1.00	0.92	0.84

[1]CT values provided in the table are modified by linear interpolation between 0.5 °C increments.

Inactivation Log Credit	Water Temperature, °C												
	13	14	15	16	17	18	19	20	21	22	23	24	25
2	0.38	0.34	0.30	0.29	0.28	0.27	0.26	0.25	0.23	0.21	0.19	0.17	0.15
3	0.62	0.56	0.50	0.48	0.46	0.44	0.42	0.40	0.37	0.34	0.31	0.28	0.25
4	0.76	0.68	0.60	0.58	0.56	0.54	0.52	0.50	0.46	0.42	0.38	0.34	0.30

[1]CT values provided in the table are modified by linear interpolation between 0.5 °C increments.

No CT table is provided for chloramines or total chlorine because the CT values would be prohibitively high for groundwater systems.

Tables are from the EPA Groundwater Rule Implementation Guidance, EPA 816-R-09-004, January 2009, pages 97-98.

ITEM 106. Amend subrule 44.10(1) as follows:

44.10(1) *Allowable costs.* Allowable costs shall be limited to those costs deemed necessary, reasonable, and directly related to the efficient completion of the project. The director will determine project costs eligible for state assistance in accordance with rule 567—44.6(455B). Land purchase, easement, or rights-of-way costs are ineligible with the exception of land which is integral to a project needed to meet or maintain public health protection and which is needed to locate eligible treatment or distribution works. Source water protection easements are considered to be integral to a project. (The acquisition of land or easements has to be from a willing seller.) In addition to those costs identified in this chapter, unallowable costs include the following:

a. Costs of service lines ~~and~~, except lead-containing service lines and connectors which are exterior to a home.

b. Costs of in-house plumbing.

~~*b.*~~ *c.* Administrative costs of the loan recipient.

~~*c.*~~ *d.* Vehicles and tools.

ITEM 107. Adopt the following **new** definitions of "Operating shift" and "Shift operator" in rule **567—81.1(455B)**:

"Operating shift" means a specified period of time when an operator is present to conduct testing or evaluation to control operations of the plant or distribution system, to make process control changes, and to be responsible for the repair or maintenance of a plant or distribution system. An operating shift may include on-call shifts.

"Shift operator" means the operator on site who has responsibility for making process control changes and adjustments to the operation, repair, and maintenance of a plant or distribution system during any operating shift. Duties include testing or evaluation to control operations of the plant or distribution system.

ITEM 108. Amend rule **567—81.1(455B)**, definition of "Rural water district," as follows:

"Rural water district" means a water supply incorporated and organized as such pursuant to Iowa Code chapter 357, 357A or ~~504A~~ 358.

ITEM 109. Adopt the following **new** paragraph **81.6(1)"c"**:

c. Transient noncommunity water system. A transient noncommunity water system which serves a population of 500 or fewer persons and provides no treatment other than hypochlorination or treatment which does not require any chemical addition, process adjustment, backwashing or media regeneration by an operator shall be classified as a Grade A water system.

ITEM 110. Amend subrule 81.7(1), introductory paragraph, as follows:

81.7(1) *Education and experience requirements.* All applicants shall meet the education and experience requirements for the grade of certificate shown in the table below prior to being allowed to take the examination. Experience shall be in the same classification for which the applicant is applying except that partial credit may be given in accordance with 81.7(2) and 81.7(3). Directly related post-high school education shall be in the same subject matter as the classification in which the applicant is applying. ~~Directly related post-high school education will be granted education credit 2.0 times the number of semester, quarter or CEU credits until January 1, 2006.~~ The director will determine which courses qualify as "directly related" in cases which are not clearly defined. A military service applicant may apply for credit for verified military education, training, or service toward any education or experience requirement for certification, pursuant to subrule 81.7(4).

ITEM 111. Rescind and reserve subrule **81.8(2)**.

ITEM 112. Amend subrule 81.9(5) as follows:

81.9(5) *Reexamination.* Upon failure of the first examination, the applicant may ~~be reexamined at the next scheduled examination~~ apply for reexamination. Upon failure of the second examination, the applicant shall be required to wait a period of ~~180~~ at least 30 days between each subsequent examination.

ITEM 113. Rescind and reserve subrule **81.9(9)**.

ITEM 114. Amend subrule 81.9(10) as follows:

81.9(10) *Reasonable accommodation.* Upon request for certification by an applicant, the director will consider on an individual basis reasonable accommodation to allow administration of the examination without discrimination on the basis of disability. The applicant shall request the accommodation 30 days prior to the date of the examination. The applicant must provide documentation of eligibility for the accommodation. Documentation shall be submitted with the completed examination application. ~~Accommodations based on documentation may include site accessibility, oral examination, extended time, separate testing area, or other concerns.~~

ITEM 115. Amend rule 567—81.12(455B) as follows:

567—81.12(455B) Restricted ~~and temporary~~ certification.

~~**81.12(1)** *Restricted certification.*~~ Upon written request by an operator, the director may determine that further education requirements be waived when a plant or distribution system grade has been increased and the operator has been in direct responsible charge of the existing plant or distribution system. An operator successfully completing the examination will be restricted to that plant or distribution system until the education requirements are met.

~~**81.12(2)** *Temporary certification.* Upon written request by the owner of a plant or system not previously required to have a certified operator, the director may issue a temporary certificate of the appropriate grade and classification to the operator(s)-in-charge. The temporary certificate holder will be restricted to that plant or distribution system until all certification requirements, in accordance with rules 567—81.6(455B), 567—81.8(455B) and 567—81.9(455B), are met. The temporary certificate is not renewable and will expire 24 months after issuance. No temporary certificates will be issued to operators of new water plants or distribution systems, as defined in 567—subrule 43.8(1).~~

ITEM 116. Amend rule **567—83.2(455B)**, definition of "Manual for the Certification of Laboratories Analyzing Environmental Samples for the Iowa Department of Natural Resources," as follows:

"Manual for the Certification of Laboratories Analyzing Environmental Samples for the Iowa Department of Natural Resources" ~~(2003)~~ (2017) (Iowa Manual) is incorporated by reference in this chapter.

Chapter 1 of the Iowa Manual pertains to certification of laboratories analyzing samples of drinking water and incorporates by reference the Manual for the Certification of Laboratories Analyzing Drinking Water, ~~4th edition, March 1997, EPA document 815-B-97-001~~ 5th edition, January 2005, EPA document 815-R-05-004, January 2005; Supplement 1, June 2008, EPA 815-F-08-006; and Supplement 2, November 2012, EPA 815-F-12-006.

Chapter 2 of the Iowa Manual, ~~2003~~ (2017), pertains to laboratories analyzing samples for the underground storage tank program.

Chapter 3 of the Iowa Manual, ~~2003~~ (2017), pertains to laboratories analyzing samples for wastewater and sewage sludge disposal programs.

Chapter 4 of the Iowa Manual, ~~2003~~ (2017), pertains to laboratories analyzing samples for the solid waste and contaminated site programs.

ITEM 117. Amend paragraph **83.3(2)"c,"** table, entry for "Basic Drinking Water," as follows:

ANALYTICAL GROUP	REGULATORY PROGRAM & PARAMETERS[1]	FEE
Basic Drinking Water	SDWA (includes total ~~and fecal~~ coliform bacteria, *E. coli*, heterotrophic plate count, nitrate, nitrite, and fluoride)	$800

ITEM 118. Amend paragraph **83.3(2)"c,"** table, entry for "Bacteria," as follows:

ANALYTICAL GROUP	REGULATORY PROGRAM & PARAMETERS[1]	FEE
Bacteria	CWA (includes total coliform, fecal coliform, and *E. coli* ~~and enterococci bacteria~~)	$800
	SDWA (includes total coliform, ~~fecal coliform,~~ *E. coli*, and heterotrophic plate count)	$800
	SDWA & CWA combined	$1,300

ITEM 119. Amend paragraph **83.3(2)"d"** as follows:

d. Payment of fees. Fees shall be paid by bank draft, check, money order, credit card, electronic payment, or other means acceptable to the department, made payable to the Iowa Department of Natural Resources. Credit card or electronic payment may incur an additional fee. Purchase orders are not an acceptable form of payment.

ITEM 120. Amend subrule 83.3(3), introductory paragraph, as follows:

83.3(3) *Reciprocity.* Reciprocal certification of out-of-state laboratories by Iowa, and of Iowa laboratories by other states or accreditation providers, is ~~encouraged~~ allowed. A laboratory must meet all Iowa certification criteria and pay all applicable fees as listed in this chapter. Any laboratory which is granted reciprocal certification in Iowa using primary certification from another state or provider is required to report any change in certification status from the accrediting state or provider to the department within ~~14~~ 15 days of notification. A laboratory that loses primary certification, either in its resident state program or third-party accreditation program, will also immediately lose certification for the same program area and parameters in Iowa, pursuant to 83.7(5)*"a"*(9).

ITEM 121. Rescind and reserve rule **567—83.4(455B)**.

ITEM 122. Amend subrule 83.6(1) as follows:

83.6(1) *Approved methodology required.* Laboratories must use the approved methodology for all analyses the results of which are to be submitted to the department. A laboratory may not analyze and report data from samples collected for an environmental program area until certified in that area.

ITEM 123. Amend subrule 83.6(2) as follows:

83.6(2) *Performance evaluation (proficiency testing) samples required.* Certified laboratories must satisfactorily analyze PEs at least once every 12 months for each analyte by each method for which the laboratory wishes to retain certification unless a PE sample is not available for the particular analyte or method. Results must be submitted to Iowa department of natural resources and the state of Iowa hygienic laboratory, or as otherwise directed, along with a statement of the method used within 30 days of receipt from the provider. The laboratory must maintain records of all PE samples for a minimum of 5 years.

ITEM 124. Amend subrule 83.6(3) as follows:

83.6(3) *Notification of major changes.* Laboratories must notify the department, in writing, within 15 days of major changes in essential personnel, equipment, laboratory location, or other major change which might alter or impair analytical capability. An example of a major change in essential personnel includes the loss or replacement of the laboratory supervisor, or a trained and experienced analyst is no longer available to analyze a particular parameter for which certification has been granted.

ITEM 125. Amend paragraph **83.6(6)"a"** as follows:

a. Water supply program.

(1) Certified laboratories must report to the department, or its designee ~~such as SHL~~, all analytical test results for all public water supplies~~,~~ in a manner acceptable to the department, using forms, including electronic forms, provided or approved by the department or by electronic means acceptable to the department. If a public water supply is required by the department to collect and analyze a sample for an analyte not normally required by 567—Chapters 41 and 43, the laboratory testing for that analyte must also be certified and report the results of that analyte to the department. It is the responsibility of the laboratory to correctly assign and track the sample identification number as well as facility ID and source/entry point data for all reported samples.

1. The following are examples of sample types for which data results must be reported:

- Routine: a regular sample which includes samples collected for compliance purposes from such locations as the source/entry point and in the distribution system, at various sampling frequencies;
- Repeat: a sample which must be collected after a positive result from a routine or previous repeat total coliform sample, per ~~567—41.2(455B).~~ 567—paragraph 41.2(1)*"j."* Repeat samples must be analyzed at the same laboratory from which the associated original routine sample was analyzed;
- Confirmation: a sample which verifies a routine sample, normally used in determination of compliance with a health-based standard, such as nitrate;
- Special: a nonroutine sample, such as raw, plant, and troubleshooting samples, which cannot be used to comply with monitoring requirements assigned by the department;
- Maximum residence time: a sample which is collected at the maximum residence time location in the distribution system, usually for disinfection byproduct measurement; and
- Replacement: a sample which replaces a missed sample from a prior monitoring period resulting in a monitoring violation.

2. to 4. No change.

(2) No change.

(3) Analytical results must be reported to and received by the ~~department's designee~~ department by the seventh day of the month following the month in which the samples were analyzed.

(4) In addition to the monthly reporting of the analytical results, the following results must be reported within 24 hours of the completion of the analysis to the department by ~~facsimile transmission (fax)~~ email or other method acceptable to the department, and to the public water supply for which the analyses were conducted:

1. No change.

2. Results of any contaminant which exceeds public drinking water standards (maximum contaminant level, treatment technique, action level, or health advisory), and any subsequent confirmation samples~~, excluding lead and copper~~.

For results available outside of routine business hours, the results must also be reported to the department's Environmental Emergency Reporting Hotline number at (515)725-8694.

(5) No change.

ITEM 126. Adopt the following **new** subrule 83.6(8):

83.6(8) *Record keeping.* The laboratory certification program appraisal authority must retain the records for on-site laboratory assessments and certification program reviews. The records must be maintained in an easily accessible manner for a period of at least six years to include the last two on-site audits. The records include correspondence used to determine compliance with the laboratory certification program requirements and may include checklists, corrective action reports, final reports, certificates, performance evaluation/proficiency testing study results, and any other related documents.

ITEM 127. Amend paragraph **83.7(1)"c"** as follows:

c. A laboratory will not be granted provisional certification by the department for water supply contaminants which pose an acute risk to human health, including nitrate, nitrite, ~~fecal coliform bacteria,~~ and *Escherichia coli* bacteria.

ITEM 128. Amend subparagraph **83.7(3)"a"(1)** as follows:

(1) Failure to analyze a PE sample annually for water supply contaminants which pose an acute risk to human health, including nitrate, nitrite, ~~fecal coliform bacteria,~~ and *Escherichia coli* bacteria, or which pose an imminent risk to the environment;

ITEM 129. Amend subparagraph **83.7(3)"a"(2)** as follows:

(2) Failure to analyze a PE sample annually within Iowa acceptance limits for water supply contaminants which pose an acute risk to human health, including nitrate, nitrite, ~~fecal coliform bacteria,~~ and *Escherichia coli* bacteria, or which pose an imminent risk to the environment;