310 CMR: DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 22.00: DRINKING WATER

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22.02: Definitions

(1) As used in 310 CMR 22.00, the following terms shall have the following meanings:

…

Public Water System means a system for the provision to the public of water for human consumption, through pipes or other constructed conveyances, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days of the year. Public Water System includes any collection, treatment, storage, and distribution facilities under control of the operator of such a system and used primarily in connection with such system, and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. The Department may presume that a system is a Public Water System as defined in 310 CMR 22.00 based on the average number of persons using a facility served by the system or on the number of bedrooms in a residential home or facility. The Department reserves the right to evaluate and determine whether two or more wells located on commonly owned property, that individually may serve less than 25 people, but collectively serve more than 25 people for more than 60 days of the year should not be regulated as a Public Water System, taking into account the risk to public health. A Public Water System includes a "Community Water System" or a "Non community Water System".

(a) Community Water System means a Public Water System which serves at least 15 service connections used by year round residents or regularly serves at least 25 year round residents.

(b) Non community Water System means a Public Water System that is not a Community Water System.

1. Non-transient Non-community Water System or NTNC means a Public Water System that is not a Community Water System and that has at least 15 service connections or regularly serves at least 25 of the same individuals~~s~~ or more approximately four or more hours per day, four or more days per week, more than six months or 180 days per year, such as a workplace providing water to its employees.

2. Transient Non-community Water System or TNC means a Public Water System that is not a Community Water System or a Non-transient Non-community Water System but is a Public Water System which has at least 15 service connections or serves water to 25 different persons at least 60 days of the year. Some examples of these types of systems are: restaurants, motels, camp grounds, parks, golf courses, ski areas and community centers.

…

Tributary means any body of running, or intermittently running, water which moves in a definite channel, naturally or artificially created, in the ground due to a hydraulic gradient, and which ultimately flows into a Class A Surface Water Source, as "Class A" is defined in 314 CMR 4.02~~5(3)(a): *Class A*~~.

…

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

Water Supply Land means (i) land containing a source of water supply (including without limitation rivers, streams, lakes, ponds, springs, reservoirs, wells and groundwaters) and (ii) land necessary for protecting and preserving the purity of a source of water supply; provided~~, where~~ such land ~~as is described in clause (i) or (ii)~~ was duly taken by eminent domain or acquired by purchase or otherwise, by an entity authorized by state law to do so and to hold and/or use the land, with the Department's prior advice and approval or prior consent and approval.

…

Zone A means:

(a) the land area between the Surface Water Source and the upper boundary of the Bank;

(b) the land area within a 400 foot lateral distance from the upper boundary of the Bank of a Class A Surface Water Source, as "Class A" is defined in 314 CMR 4.0~~5(3)(a): *Class A*~~2; and

(c) the land area within a 200 foot lateral distance from the upper boundary of the Bank of a Tributary or associated Surface Water body.

Zone B means the land area within ½ mile of the upper boundary of the Bank of a Class A Surface Water Source, as "Class A" is defined in 314 CMR 4.0~~5(3)(a): *Class A*~~2, or edge of Watershed, whichever is less. However, Zone B shall always include the land area within a 400-foot lateral distance from the upper boundary of the Bank of the Class A Surface Water Source.

Zone C means the land area not designated as Zone A or B within the Watershed of a Class A Surface Water Source as "Class A" is defined ~~at~~ in 314 CMR 4.0~~5(3)(a): *Class A*~~2.

…

Unapproved Source means the source or distribution system for any water or other liquid or substance which has not been approved by the Department as being of safe and sanitary quality for human consumption, including but not limited to any waste pipe, soil pipe, sewer, drain, or non-acceptable potable water system material.

(3) Online Reference Sources. References within 310 CMR 22.00 to the following online references, unless otherwise provided, shall have the following meanings:

ASTM International means the online searchable database of standards and publications of the society known as ASTM International, formerly known as the American Society for Testing and Materials.

National Environmental Methods Index or NEMI means the online searchable database of environmental methods, protocols, statistical and analytical methods, and procedures, created under the auspices of the National Water Quality Monitoring Council.

National Service Center for Environmental Publications or NSCEP means EPA's searchable online database of technical, scientific, and educational materials.

Standard Methods Online means the online database of analytical techniques for the determination of water quality known as the *Standard Methods for the Examination of Water and Wastewater* or *Standard Methods*, the result of a joint effort by the American Public Health Association, 800 I Street NW., Washington, DC 20001; the American Water Works Association; and the Water Environment Federation.

22.03: Compliance

...

(2) A Supplier of Water, upon request by the Department, shall sample and analyze its water for any parameter, at any location and frequency, deemed necessary to prevent the pollution of and secure the sanitary protection of waters used as sources of water supply and to ensure the delivery of a fit and pure water supply to all consumers. All sampling and analysis deemed necessary hereunder shall be performed~~, in accordance with 310 CMR 22.00.~~ as directed by the Department, based upon any applicable or relevant procedures specified in 310 CMR 22.00, the nature of the requested parameter, available methodologies for sampling and analysis, and site-specific conditions. All results of such sampling and analysis shall be reported to the Department as directed and in accordance with 310 CMR 22.00. A Supplier of Water that fails to report such results to the Department as directed, and in accordance with 310 CMR 22.00, shall be presumed to have failed to conduct such monitoring.

…

(8) In the event the Department finds on the basis of a health assessment made by the Department's Office of Research and Standards that the level of any contaminant found in water collected within a Distribution System and/or at a Sampling Point at the entry to a Distribution System, poses an unacceptable health risk to consumers, acting alone or in combination with other contaminants, the Supplier of Water shall take appropriate actions to reduce the level of contaminant concentrations to levels the Department deems safe or remove the source of supply from service by the deadline specified by the Department. The Supplier of Water shall ~~be required to~~ monitor the source as directed by the Department, provide public notification as directed by the Department and promptly notify the Department of the actions it intends to take in response to a finding that a source of supply poses an unacceptable risk to health.

…

22.04: Construction, Operation and Maintenance of Public Water Systems

(1) New or Substantially Modified Public Water Systems. Any Person proposing to construct a new Public Water System, operate a Public Water System or to substantially modify an existing Public Water System shall obtain the prior written approval of the Department, by at a minimum demonstrating to the Department's satisfaction that:

...

(f) in the case of Transient Non-community Water Systems or, if deemed necessary by the Department, any other Public Water System~~, if deemed necessary by the Department,~~ a notice has been or shall be recorded on the deed of the property where a drinking water source serving such Public Water System is located, stating that such property contains a drinking water source subject to 310 CMR 22.00; and

(g) the staffing of the Public Water System complies with 310 CMR 22.11B and any related policies established by the Department or the Board of Certification of Operators of Drinking Water Supply Facilities.

…

(12) Sanitary Surveys. The Department or its agent may conduct Sanitary Surveys of Public Water Systems to evaluate each system's source, facilities, equipment, operation, monitoring schedule, technical, managerial and financial capacity, and maintenance procedures at a frequency determined by the Department.

…

(c) If a Significant Deficiency is identified by the Department or its agent during a Sanitary Survey at a groundwater Public Water System conducted to comply with 310 CMR 22.26(2), the system must comply with the requirements of 310 CMR 22.26(4)(a). Unless the Department requires the groundwater system to implement corrective action, the groundwater system shall consult with the Department in accordance with the schedule listed under 310 CMR 22.26(4)(a)4. and 5.

(13) Emergencies.

(a) Each Supplier of Water must prepare and keep in an easily accessible location an Emergency Response Plan prepared in accordance with 310 CMR 22.04(13) and *Massachusetts Drinking Water Guidelines and Policies for Public Water Supplies, Chapter 12 - Emergency Response Planning Requirements Guidance* including *Appendix O - Handbook for Water Supply Emergencies*. The Emergency Response Plan shall be designed to ensure that the water supplier is able to respond effectively to potential and actual Emergencies. The Emergency Response Plan shall include detailed steps that the water supplier shall implement to ensure the continuation of service in the event of a potential or actual Emergency, including but not limited to:

…

9. An act of vandalism or sabotage (including without limitation cyberattack) that has the potential to impact or impacts water quality or the quantity of water available to the system.

…

(b) The Emergency Response Plan required by 310 CMR 22.04(13) shall include, at a minimum, a description of the procedures, structures and equipment used to respond to potential or actual Emergencies, including but not limited to:

…

10. A plan for annually training staff and local partners in Emergency response procedures to ensure that they are familiar with ~~the~~ all Emergency procedures, equipment and systems; and

…

22.05: Maximum Microbiological Contaminant Levels, Monitoring Requirements and Analytical Methods

(1) Routine Coliform Monitoring.

(a) General Requirements. Each Supplier of Water shall collect total coliform samples at sites which are representative of water throughout the Distribution System, at the entry point to the Distribution System, and at storage facilities. All such samples shall be collected at the frequency applicable to total coliform sampling set forth in the coliform sampling plan for that Supplier of Water's Public Water System. Samples required to be collected at the entry point to the Distribution System, in accordance with an approved coliform sampling plan required by 310 CMR 22.05(1)(a)3., shall be collected in addition to the minimum number of samples required pursuant to 310 CMR 22.05(1)(b), as set forth in 310 CMR 22.05: *Table 1*. Samples required to be collected at storage facilities, in accordance with an approved coliform sampling plan required by 310 CMR 22.05(1)(a)3., shall be collected in addition to the minimum number of samples required pursuant to 310 CMR 22.05(1)(b), as set forth in 310 CMR 22.05: *Table 1*, unless otherwise provided in the coliform sampling plan. The Department may require additional routine monitoring samples to ensure adequate Distribution System representation.

…

3. Coliform Sampling Plan. A Supplier of Water shall develop and implement a written coliform sampling plan that identifies sampling sites and a sample collection schedule that are representative of water throughout the Distribution System. These plans, including any revisions to these plans, are subject to Department review, revision and approval. The Supplier of Water shall ensure that an approved sampling plan continues to be representative of water throughout the Distribution System, including seeking Department approval for a sampling plan revision as necessary. Monitoring required by 310 CMR 22.05(1) and (2) may take place at a customer's premises, a Department approved dedicated sampling station, or other designated compliance sampling location. Routine and repeat sample sites and any Sampling Points necessary to meet the requirements of 310 CMR 22.05(1) and (2), and 22.26 must be reflected in the sampling plan.

…

c. A Supplier of Water, subject to Department approval, may conduct more compliance monitoring than is required by 310 CMR 22.05~~(1)~~ to investigate potential problems in the Distribution System and use monitoring as a tool to assist in uncovering problems. If a Supplier of Water takes more than the minimum number of required routine samples at the locations specified in the existing coliform sampling plan, then the Supplier of Water shall include those sampling results in calculating whether the coliform Treatment Technique trigger in 310 CMR 22.05(4)(a)1.a. or b. has been exceeded. If a Supplier of Water takes samples at locations not previously specified in the existing coliform sampling plan, and the Department determines that these locations are representative of water throughout the Distribution System, the Supplier of Water shall include those sampling results in calculating whether the coliform Treatment Technique trigger in 310 CMR 22.05(4)(a)1.a. or b. has been exceeded.

d. A Supplier of Water shall identify repeat monitoring locations in the coliform sampling plan. Unless a Supplier of Water has obtained the Department's approval pursuant to 310 CMR 22.05(1)(a)3.d.i. or ii., that Supplier of Water must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the Distribution System, or one service connection away from the end of the Distribution System, the Supplier of Water must still take all required repeat samples. The Supplier of Water, subject to Department approval, may propose an alternative sampling location in lieu of the requirement to collect at least one repeat sample upstream or downstream of

the original sampling site in accordance with 310 CMR 22.05(1)(a)3.d.i. or ii. Except as provided for in 310 CMR 22.05(1)(a)3.d.ii., a Supplier of Water required to conduct triggered source water monitoring under 310 CMR 22.26 shall take groundwater source sample(s) in addition to repeat samples required under 310 CMR 22.05~~(1)(a)3.d~~.

…

(c) Routine monitoring requirements for Community Water Systems serving 1,000 or fewer people using only groundwater. 310 CMR 22.05(1)(c) shall apply to Community Water Systems using only groundwater (except Groundwater under the Direct Influence of Surface Water, as defined in 310 CMR 22.02(1)) and serving 1,000 or fewer people.

1. Following any total coliform-positive sample taken under 310 CMR 22.05(1)(c), Public Water Systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in 310 CMR 22.05(2).

2. Once all monitoring required by 310 CMR 22.05(1)(c) and (2) for a calendar month has been completed, Suppliers of Water must determine whether any coliform Treatment Technique triggers specified in 310 CMR 22.05(4)(a) have been exceeded. If any trigger has been exceeded, Suppliers of Water must complete assessments as required by 310 CMR 22.05(4)~~(b)~~.

…

(d) Routine monitoring requirements for Non-community Water Systems serving 1,000 or fewer people using only groundwater.

…

4. Criteria for Quarterly Monitoring. Notwithstanding 310 CMR 22.05(1)(d)2., any Supplier of Water approved in writing by the Department for quarterly monitoring prior to April 1, 2016 may remain on quarterly monitoring unless the Department determines otherwise pursuant to 310 CMR 22.05(1)(d)3. and except as provided in 310 CMR 22.05(1)(d)5. A Supplier of Water may submit a written request to reduce the monitoring frequency for its Public Water System from monthly monitoring to quarterly monitoring, subject to the following requirements. The Supplier of Water must demonstrate, subject to the Department's written approval, that its Public Water System meets the criteria set forth in 310 CMR 22.05(1)(d)4.a. through f.

a. The Public Water System must have a Clean Compliance History for the preceding 12 months;

b. The Public Water System must be found to be free of Sanitary Defects based upon one or more of the following, which must have occurred during the preceding 12 months:

…

6. Seasonal Systems.

…

b. Monitoring Frequency for Total Coliforms. All Suppliers of Water who operate a Seasonal System described in 310 CMR 22.05(1)(d)1.a. shall monitor for total coliforms each calendar month that it is in operation unless it meets the criteria in 310 CMR 22.05(1)(d)6.b.i. ~~through~~ and ii~~i~~. to be eligible for monitoring less frequently than monthly, except as provided in 310 CMR 22.05(1)(d)3.

…

7. Additional Routine Monitoring the Month Following a Total Coliform-positive Sample. A Public Water System collecting samples on a quarterly frequency shall conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). A Public Water System shall collect at least three routine samples during the next month, except that the Supplier of Water may request, subject to approval from the Department a waiver of this requirement if the conditions of 310 CMR 22.05(1)(d)7.a., b., or c. are met. A Public Water System shall either collect samples at regular time intervals throughout the month or shall collect all required routine samples on a single day if samples are taken from different sites. A Public Water System shall use the results of additional routine samples in coliform Treatment Technique trigger calculations under 310 CMR 22.05(4)(a).

…

b. A Supplier of Water may request, subject to approval from the Department, a waiver of the requirement to collect three routine samples the next month in which its Public Water System provides water to the public, if, based upon appropriate submittals:

i. the Department has determined why the sample was total coliform-positive; and

ii. the Department has established that the Public Water System has corrected the problem or will correct the problem before the end of the next month in which the Public Water System serves water to the public.

For purposes of 310 CMR 22.05(1)(d)7.b., approval from the Department shall mean a written waiver recommendation by a Department official describing how the requirements in 310 CMR 22.05(1)(d)7.b.i. and ii. have been met~~, which~~ that has been approved and signed by that official's supervisor. A copy of such approval shall be made available to EPA and the public and shall be effective upon receipt by the Supplier of Water.~~The waiver shall be effective once the Supplier of Water has received written documentation from the Department of its decision describing the specific cause of the total coliform-positive sample and what action the Public Water System has taken and/or will take to correct this problem, a copy of which shall be made available to EPA and the public.~~

…

(e) Routine Monitoring Requirements for Public Water Systems Serving More than 1,000 People.

…

7. Reduced Monitoring. No Public Water Systems described in 310 CMR 22.05(1)(e) shall reduce monthly monitoring, except for Non-community Water Systems using only groundwater (and not Groundwater Under the Direct Influence of Surface Water) serving 1,000 or fewer people in some months and more than 1,000 people in other months. In months when more than 1,000 people are served, the Supplier of Water shall monitor at the frequency specified in 310 CMR 22.05(1)(e). In months when 1,000 or fewer people are served, the Supplier of Water may request in writing, subject to written approval from the Department, reducing the monitoring frequency to a frequency allowed under 310 CMR 22.05(1)(d) for a similarly situated Public Water System that always serves 1,000 or fewer people, taking into account the provisions in 310 CMR 22.05(1)(d)4. and 5.

(f) Routine monitoring requirements for Surface Water or Groundwater under the Direct Influence of Surface Water Public Water Systems serving 1,000 or fewer people.

1. 310 CMR 22.05(1)(f) applies to Surface Water or Groundwater under the Direct Influence of Surface Water Public Water Systems serving 1,000 or fewer people.

2. Following any total coliform-positive sample taken under 310 CMR 22.05(1)(f)~~1~~., a Supplier of Water shall comply with the repeat monitoring requirements and *E. coli* analytical requirements in 310 CMR 22.05(2).

3. Once all monitoring required by 310 CMR 22.05(1)(f) and (2) for a calendar month has been completed, a Supplier of Water shall determine whether any coliform Treatment Technique triggers specified in 310 CMR 22.05(4) have been exceeded. If any trigger has been exceeded, a Supplier of Water shall complete assessments as required by 310 CMR 22.05(4).

4. Seasonal Systems.

a. All Seasonal Systems must demonstrate completion of a Department-approved start-up procedure, in accordance with 310 CMR 22.05(1)(d)6.a.~~ and (e)3.a.~~ which includes a requirement for start-up sampling prior to serving water to the public.

b. The Department may exempt any Seasonal System from some or all of the requirements for Seasonal Systems if the entire Distribution System remains pressurized during the entire period that the system is not operating.

…

(2) Repeat Monitoring and *E. coli* Requirements.

…

(g) *Escherichia coli (E. coli)* Testing.

1. If any routine or repeat sample is total coliform-positive, the Supplier of Water shall analyze that total coliform-positive culture medium to determine if *E. coli* are present. If *E. coli* are present the Supplier of Water must notify and consult with the Department as soon as possible but no later than the end of the day when the Supplier of Water is notified of the test result~~learns of an *E. coli* MCL violation~~. If the Public Water System receives such notification outside of the Department's regular business hours, then it shall provide notification to the Department by calling the Department's Emergency notification telephone number and using any other electronic reporting tool designated by the Department, or other Department designated numbers.

…

(3) Invalidation of Total Coliform Samples. A total coliform-positive sample invalidated under 310 CMR 22.05(3) does not count towards meeting the minimum monitoring requirements of 310 CMR 22.05(1).

(a) A Supplier of Water may request that a total coliform-positive sample be invalidated, subject to Department approval. Any such request shall satisfy the conditions of 310 CMR 22.05(3)(a)1., 2. or ~~through~~ 3.

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

2. The Supplier of Water demonstrates, on the basis of the results of repeat samples collected as required by 310 CMR 22.05(2)(a) through (~~d~~), that the total coliform-positive sample resulted from a domestic or other non-Distribution System plumbing problem. No sample shall be invalidated on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected at a location other than the original tap are total coliform-negative (*e.g.*, no total coliform-positive sample shall be invalidated on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the Public Water System has only one service connection).

3. The Department has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the Distribution System. In this case, the Supplier of Water must still collect all repeat samples required under 310 CMR 22.05(2)(a) through (~~d~~), and use them to determine if a coliform Treatment Technique trigger in 310 CMR 22.05(4) has been exceeded. To invalidate a total coliform-positive sample under 310 CMR 22.05(3)(a)3., the decision and supporting rationale must be documented in writing, and approved and signed by the supervisor of 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 Supplier of Water 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.

(b) A laboratory must invalidate a total coliform sample (unless total coliforms are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (*e.g.*, the Multiple-tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P-A) Coliform Test, or exhibits confluent growth or produces colonies Too Numerous to Count with an analytical method using a membrane filter (*e.g.*, Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the Supplier of Water must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The Supplier of Water must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The Department may waive the 24-hour time limit on a case-by-case basis.

(4) Coliform Treatment Technique Triggers and Assessment Requirements for Protection against Potential Fecal Contamination.

…

(b) Requirements for Assessments.

…

3. Level 1 Assessments. A Supplier of Water must conduct a Level 1 Assessment consistent with Department requirements if the Public Water System exceeds one of the Treatment Technique triggers in 310 CMR 22.05(4)(a)1.

…

c. All Level 1 Assessments, including any revised Level 1 Assessments pursuant to 310 CMR 22.05(4)(b)3.b. shall be subject to the Department's review to determine whether the Supplier of Water has identified a likely cause for the Level 1 trigger and whether the Supplier of Water has corrected the problem, or has included a schedule acceptable to the Department for correcting the problem and has implemented ~~including~~ any Department-specified interim measures ~~for correcting the problem~~.

…

4. Level 2 Assessments. A Supplier of Water must ensure that a Level 2 Assessment consistent with Department requirements is conducted if the Public Water System exceeds one of the Treatment Technique triggers in 310 CMR 22.05(4)(a)2. The Supplier of Water shall comply with any expedited actions or additional actions required by the Department in the case of an *E. coli* MCL violation.

…

d. Upon the Supplier of Water completing and submitting the assessment form, the Department will determine if the Supplier of Water has identified a likely cause for the Level 2 trigger and if so the Department will determine whether the Supplier of Water has corrected the problem, or has included a schedule acceptable to the Department for correcting the problem, and has implemented any Department-specified interim measures.

…

(6) Analytical Methodology.

…

Organism	Methodology Category	Method[1]	Citation[1]
Total Coliforms	Membrane Filtration Methods	Standard Total Coliform Membrane Filter Procedure	Standard Methods 9222 B, C (20th ed.; 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 ed.; 21st ed.)[2, 5]
			Standard Methods Online 9223 B-97[2, 5]
		Colisure®	Standard Methods 9223 B (20th ed.; 21st ed.)[2, 5, 6]
			Standard Methods Online 9223 B-97[2, 5, 6]
		E*Colite® Test[2]	~~Standard Methods Online 9223 B-97[2, 5, 6]~~
		Readycult® Test[2, 9] ~~modified~~	
		modified Colitag® Test[2]	

Escherichia coli	*Escherichia coli* Partition Method	EC broth with MUG (EC-MUG)	Standard Methods 9222 G.1 c(2) (20th ed.; 21st ed.)[2, 8]
		NA-MUG medium	Standard Methods 9222 G.1c(1) (20th ed.; 21st ed.)[2]
	Membrane Filtration Methods	Membrane Filtration using MI medium	EPA Method 1604[2]
		m-ColiBlue24® Test[2, 4]	~~EPA Method 1604[2]~~
		Chromocult[2, 4]	
	Enzyme Substrate Methods	Colilert®	Standard Methods 9223 B (20th ed.; 21st ed.)[2, 5]
			Standard Methods Online 9223 B-97[2, 5, 6]
		Colisure®	Standard Methods 9223 B (20th ed.; 21st ed.)[2, 5, 6]~~Standard Methods Online 9223 B-97[2, 5, 6]~~
			Standard Methods Online 9223 B-97[2, 5, 6]
		E*Colite® Test[2]	~~Standard Methods 9223 B (20th ed.; 21st ed.)[2, 5, 6]~~
		Readycult® Test[2]	~~Standard Methods Online 9223 B-97[2, 5, 6]~~
		modified Colitag® Test[2]	

[1] The procedures must be done in accordance with the documents listed in 310 CM R 22.05(6)(g). For Standard Methods, either editions, 20th (1998) or 21st (2005), may be used. For the Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions that may be used. For vendor methods, the date of the method listed in 310 CMR 22.05(6)(g) 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* 310 CMR 22.05(6)(g).

[3] Lactose broth, as commercially available, may be used in *lieu* of lauryl tryptose broth, if the Public Water System conducts at least 25 parallel tests between lactose broth and lauryl tryptose broth using the water normally tested, and if the findings from this comparison demonstrate that the false-positive rate and false-negative rate for total coliforms, using lactose broth, is less than 10% .

[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 pre-sterilized 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 310 CMR 22.00.

[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 regulation.

[8] The following changes must be made to the EC broth with MUG (EC-MUG) formulation: Potassium dihydrogen phosphate, KH~~2~~$_2$PO~~4~~$_4$, must be 1.5g, and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

…

(g) Incorporation by Reference. The following standards are incorporated by reference into 310 CMR 22.05.

1. American Public Health Association, 800 I Street, NW., Washington, DC 20001.
   a. *Standard Methods for the Examination of Water and Wastewater*, 20th edition (1998):
      i. Standard Methods 9222, *Membrane Filter Technique for Members of the Coliform Group*, B, *Standard Total Coliform Membrane Filter Procedure.*
      ii. Standard Methods 9222, *Membrane Filter Technique for Members of the Coliform Group*, C, *Delayed-Incubation Total Coliform Procedure.*
      iii. Standard Methods 9223, *Enzyme Substrate Coliform Test*, B, *Enzyme Substrate Test*, Colilert® and Colisure®.
      iv. 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).*
      v. Standard Methods 9222, *Membrane Filter Technique for Members of the Coliform Group*, G.1.c(1), *Escherichia coli Partition Method: NA-MUG medium.*
   b. *Standard Methods for the Examination of Water and Wastewater*, 21st edition (2005):
      i. Standard Methods 9222, *Membrane Filter Technique for Members of the Coliform Group*, B, *Standard Total Coliform Membrane Filter Procedure.*
      ii. Standard Methods 9222, *Membrane Filter Technique for Members of the Coliform Group*, C, *Delayed-Incubation Total Coliform Procedure.*
      iii Standard Methods 9223, *Enzyme Substrate Coliform Test*, B, *Enzyme Substrate Test*, Colilert® and Colisure®.

iv. 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)*.

v. Standard Methods 9222, *Membrane Filter Technique for Members of the Coliform Group*, G.1.c(1), *Escherichia coli Partition Method: NA-MUG medium*.

c. Standard Methods Online ~~available at http://www.standardmethods.org~~.

i. Standard Methods Online 9222, *Membrane Filter Technique for Members of the Coliform Group* (1997), B-97, *Standard Total Coliform Membrane Filter Procedure*.

ii. Standard Methods Online 9222, *Membrane Filter Technique for Members of the Coliform Group* (1997), C-97, *Delayed-incubation Total Coliform Procedure*.

iii. Standard Methods Online 9223, *Enzyme Substrate Coliform Test* (1997), B-97, *Enzyme Substrate Test*, Colilert® and Colisure®.

2. Charm Sciences, Inc., 659 Andover Street, Lawrence, MA 01843-1032, telephone 1-800-343-2170: E*Colite® - *Charm E*Colite~~TM~~™ Presence/Absence Test for Detection and Identification of Coliform Bacteria and Escherichia coli in Drinking Water*, January 9, 1998.

3. CPI International, Inc., 5580 Skylane Blvd., Santa Rosa, CA, 95403, telephone 1-800-878-7654: modified Colitag®, ATP D05-0035-*Modified Colitag~~TM~~™ Test Method for the Simultaneous Detection of E. coli and other Total Coliforms in Water*, August 28, 2009.

4. EMD Millipore (a division of Merck KGaA, Darmstadt Germany), 290 Concord Road, Billerica, MA 01821, telephone 1-800-645-5476:

a. 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.

b. Readycult® - *Readycult® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and Escherichia coli in Finished Waters*, January 2007, Version 1.1.

5. EPA's Water Resource Center (MC-4100T), 1200 Pennsylvania Avenue NW., Washington, DC 20460, telephone 1-202-566-1729: 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. Available online in EPA's Docket EPA-HQ-OW-2008-0878. ~~*http://www.epa.gov/nerlcwww/1604sp02.pdf.*~~

6. Hach Company, P.O. Box 389, Loveland, CO 80539, telephone 1-800- 604-3493: m-ColiBlue24® - *Membrane Filtration Method m-ColiBlue24® Broth*, Revision 2, August 17, 1999.

…

(9) Best Available Technology, Treatment Techniques.

(a) The following have been determined to provide best available technology, treatment techniques or other means available for achieving compliance with the Maximum Contaminant Level for *E. coli* in 310 CMR 22.05(8)(a):

…

4. Filtration and/or disinfection of surface water, as described in 310 CMR 22.20A, 310 CMR 22.20D, 22.20F, and 22.20G or disinfection of ground water, as described in 310 CMR 22.26 (referred to therein as "inactivation"), using strong oxidants such as chlorine, chlorine dioxide, or ozone; and

5. For Public Water Systems using groundwater, compliance with the Department's wellhead protection requirements under 310 CMR 22.21~~(1)~~.

…

(11) Violations.

…

(c) Monitoring Violations. Each of the following occurrences is a monitoring violation:

1. failure to take every required routine or additional routine sample in a Compliance Period; or

2. failure to analyze for *E. coli* following a total coliform-positive routine sample ~~is a monitoring violation~~.

(d) Reporting Violations. Each of the following occurrences is a reporting violation:

1. failure to submit a monitoring report or completed assessment form after a Public Water System properly conducts monitoring or assessment by the deadlines established in 310 CMR 22.15(2)(a) and (b), and 22.05(4)(b)3.a. and 4.a. respectively;

2. failure to notify the Department following an *E. coli*-positive sample as required by ~~310 CMR 22.05(12)(a)1.b. and by the deadline established in~~ 310 CMR 22.05(2)(g)1.;

…

(e) Violation of the National Primary Drinking Water Regulations. The national primary drinking water regulations provide that failure to comply with the applicable requirements of 310 CMR 22.05 shall constitute a violation under subpart Y of 40 CFR 141.

(12) Reporting and Recordkeeping.

(a) Reporting.

…

2. A Supplier of Water whose Public Water System has violated the Treatment Technique for coliforms in 310 CMR 22.05(4)~~(a)~~ shall report the violation to the Department no later than the end

of the next business day after it learns of the violation, and notify the public in accordance with 310 CMR 22.16.

…

5. At the beginning of each operating period, a Supplier of Water of a Seasonal System shall certify, prior to serving water to the public, that it has complied with the Department-approved start-up procedure in accordance with 310 CMR 22.05(1)(d)6.a. or (e)~~3~~5.a.

…

22.06: Inorganic Chemical Maximum Contaminant Levels, Monitoring Requirements and Analytical Methods

…

(5) Asbestos Sampling Frequency. The frequency of monitoring conducted to determine compliance with the Maximum Contaminant Level for asbestos specified in 310 CMR 22.06(2) shall be conducted as follows:

…

(k) Previously Collected~~Grandfathered~~ Asbestos Data. If monitoring data collected after January 1, 1990 are generally consistent with the requirements of 310 CMR 22.06(5), the data may be used with the Department~~'~~'s approval, to satisfy the monitoring requirement for the Initial Compliance Period beginning January 1, 1993.

(6) Sampling Frequency for IOCs. The frequency of monitoring conducted to determine compliance with the Maximum Contaminant Levels in 310 CMR 22.06(2) for antimony, arsenic, beryllium, barium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be as follows:

(a) IOCs Sampling Frequency. Groundwater systems shall take one sample at each Sampling Point once every ~~three years~~ Compliance Period. Surface Water systems (or combined surface/ground) shall take one sample annually at each Sampling Point.

…

(d) Basis of an IOC Waiver ~~& Grandfathered Use of Historic Data~~. A waiver may be granted by the Department provided the Surface Water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (Analytical monitoring results must have been representative of all sources at the time of sampling.) Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the Maximum Contaminant Level. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the New Source have been completed.

(e) Basis of the IOC Sampling Frequency During a Waiver. The granting of a waiver by the Department will be based on the following:

1. Reported concentrations from all previous monitoring;
2. The degree of variation in reported concentrations; and
3. Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the system~~'~~'s configuration, changes in the system~~'~~'s operating procedures, or changes in stream flows or characteristics.

(f) Effect of an IOC Waiver. A Supplier of Water must have received a written approval from the Department which shall set forth the basis for the determination. The determination may be initiated by the Department or upon an application by the Public Water System. The Public Water System shall specify the basis for its request. The Department may revise its determination of the appropriate monitoring frequency, if the system submits new monitoring data or when other data relevant to the system~~'~~'s appropriate monitoring frequency become available.

…

(i) IOCs Reliably & Consistently below the MCL. If the system is reliably and consistently below the Maximum Contaminant Level, the quarterly monitoring requirement may be decreased with the Department~~'~~'s approval to the frequencies specified in 310 CMR 22.06(6)(a). Systems requesting this decrease must have taken at a minimum two quarterly samples for a groundwater system and four quarterly samples for a Surface Water system.

…

(7) Sampling Frequency for Nitrate. All Public Water Systems (Community, Non-transient Non-community, and Transient Non-community Water Systems) shall monitor to determine compliance with the Maximum Contaminant Level for nitrate specified in 310 CMR 22.06(2).

…

(c) Ground Water Repeat Nitrate Sampling Frequency. For all Public Water Systems: the repeat monitoring frequency for groundwater systems shall be quarterly for at least one year following any one sample in which the concentration is >50% the MCL. A groundwater system may reduce the sampling frequency to annually with the Department~~'~~'s approval, after four consecutive quarterly samples are reliably and consistently less than the MCL.

(d) Surface Water Repeat Nitrate Sampling Frequency. All Public Water Systems with Surface Water Sources may reduce the sampling frequency to annually with the Department~~'~~'s approval, if all analytical results from four consecutive quarters are <50% of the MCL. A Surface Water system shall return to quarterly monitoring if any one sample is ≥50% of the MCL.

…

(8) Sampling Frequency for Nitrite. All Public Water Systems (Community, Non-transient Non-community, and Transient Non-community Water Systems) shall monitor to determine compliance with the Maximum Contaminant Level for nitrite in 310 CMR 22.06(2).

…

(c) Above the Nitrite Trigger Level. For Community, Non-transient Non-community, and Transient Non-community Water Systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is >50% of the MCL. With the Department~~'~~s approval, a system may reduce the sampling frequency to annually if the system is reliably and consistently less than the MCL.

…

(9) Sampling Frequency for Perchlorate.

…

(b) Previously Collected~~Grandfathered~~ Perchlorate Data. If the perchlorate monitoring data collected by a Public Water System after January 1, 2004 is consistent with the requirements of 310 CMR 22.06(9), such data may be used with the Department's approval to satisfy the initial monitoring requirements specified in 310 CMR 22.06(9)(a).

…

(16) Analytical and Sampling Methods for Inorganics:

(a) Analytical Methods for IOCs: Analysis for the listed inorganic contaminants shall be conducted using the following methods:

INORGANIC CONTAMINANTS ANALYTICAL METHODS
Reference (Method Number)

Contaminant	Methodology[11]	EPA	ASTM [3]	SM [4]	SM Online[23]	Other
Antimony	Atomic Absorption: Furnace			3113B	3113 B-99	
	Atomic Absorption: platform	[2]200.9				
	ICP-Mass Spectrometry	[2]200.8				
Arsenic[12]	Hydride-Atomic Absorption		D-3697-92, 02			
	Atomic Absorption: Furnace		D2972-97C, 03C	3113B	3113 B-99	
	Atomic Absorption; Hydride		D-2972-97, 03B	3114B	3114 B-97	
	Inductively Coupled Plasma[13]	[2]200.7		3120B[5]	3120 B-99	
	ICP-Mass Spectrometry	[2]200.8				
	Atomic Absorption; Platform	[2]200.9				
	Differential Pulse Anodic Stripping Voltametry					Method 1001[16]
Asbestos	Transmission Electron Microscopy	[9]100.1				
	Transmission Electron Microscopy	[10]100.2				
Barium	Atomic Absorption; Furnace			3113B	3113B-99	
	Atomic Absorption; Direct			3111D	3111D-99	
	Inductively Coupled Plasma	[2]200.7		3120B	3120B-99	
	ICP-Mass Spectrometry	[2]200.8				
Beryllium	Atomic Absorption; Furnace		D3645-97, 03B	3113B	3113B-99	
	Atomic Absorption; Platform	[2]200.9				
	Inductively Coupled Plasma	[2]200.7		3120B	3120B-99	
	ICP-Mass Spectrometry	[2]200.8				
Contaminant	Methodology[11]	EPA	ASTM [3]	SM [4]	SM Online[23]	Other
Cadmium	Atomic absorption; Furnace			3113B	3113B-99	
	Inductively-coupled Plasma	[2]200.7				
	ICP-Mass Spectrometry	[2]200.8				
	Atomic Absorption; Platform	[2]200.9				
Chromium	Atomic absorption; Furnace			3113B	3113B-99	
	Inductively Coupled Plasma	[2]200.7		3120B	3120B-99	
	ICP-Mass Spectrometry	[2]200.8				
	Atomic Absorption; Platform	[2]200.9				
Cyanide	Manual Distillation		D2036-98A	4500-CN¯C		
	Manual Distillation followed by: Spectrophotometric, Amenable		D2036-98B	4500-C¯NG	4500-CN ¯G-99	
	Manual Distillation followed by Spectrophotometric, Manual		D2036-98A	4500-CN ¯E	4500-CN ¯E-99	I-3300-85[5]
	Spectrophotometric, Semi-automated	[6]335.4				
	Selective Electrode			4500-CN ¯F	4500-CN ¯F-99	
	UV, Distillation, Spectrophotmetric Micro					

	Distillation, Flow Injection Spectrophotometric					Kelada-01[18] QuikChem10-204-00-1-X[19]
	Ligand Exchange and Amperometry[22]	D6888-04			OIA-1677-DW [21]	
Mercury	Manual cold vapor	[2]245.1	D3223-97,02	3112B	3112B-99	
	Automated cold vapor	[1]245.2				
	ICP-Mass Spectrometry	[2]200.8				
Nickel	Atomic Absorption: Furnace			3113B	3113B-99	
	Atomic Absorption: Platform	[2]200.9				
	Atomic Absorption Direct			3111B	3113B-99	
	Inductively Coupled Plasma	[2]200.7		3120B	3120-99	
	ICP-Mass Spectrometry	[2]200.8				
Nitrate	Manual cadmium reduction		D3867-90B	4500-NO_3^-E	4500-NO_3^-E-00	
	Automated cadmium reduction	[6]353.2	D3867-90A	4500-NO_3^-F	4500-NO_3^-F-00	
	Ion selective electrode			4500-NO_3^-D	4500-NO_3^-D-0	601[7]
	Ion chromatography	[6]300.0 [20]300.1	D4327-97,03	4110B	4110B-00	B-1011[8]
	Capillary Ion Electrophoresis					D6508-00, Rev.2[24]
Nitrite	Spectrophotometric			4500-NO_2^-B	4500-NO_2^-B-00	
	Automated cadmium reduction	[6]353.2	D3867-90A	4500-NO_3^-F	4500-NO_3^-F-00	
	Manual cadmium reduction		D3867-90B	4500-NO_3^-E	4500-NO_3^-E-00	
	Ion chromatography	[6]300.0 [20]300.1	D4327-97,03	4110B	4110B-00	B-1011[8]
	Capillary Ion Electrophoresis					D6508-00, Rev.2[24]
Perchlorate	Ion chromatography	[14]314.0 [15]314.1				
	LC/MS or LC/MS/MS	[16]331				
	IC/MS or IC/MS/MS	[17]332				
Selenium	Hydride-Atomic absorption;		D3859-98,03A	3114B	3114B-97	
	Atomic Absorption: Furnace		D3859-98,03B	3113B	3113B-99	
	ICP-Mass Spectrometry	[2]200.8				
	Atomic Absorption; Platform	[2]200.9				
Thallium	Atomic absorption; Platform	[2]200.9				
	ICP-Mass Spectrometry	[2]200.8				

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1-11 and 15 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 900-426-4791. 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 Capital Street, NW., Suite 700, Washington, DC.

[1] *Methods of 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, PB 95-125472.

[3] Annual Book of ASTM Standards, 1994, 1996, or 1999 Vols. 11.01 and 11.02, American Society for Testing and Materials. The previous versions of D1688-95A, D1688-95C (copper), D3559-95D (lead), D1293-95 (pH), D1125-95A, (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, Vols. 11.01. Copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

[4] 18th, 19th, and 20th edition of *Standard Methods for the Examination of Water and Wastewater*, 18th (1982), 19th (1995), and 20th (1998) editions, American Public Health Association; either edition may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005. The cited methods published in any of these three editions may be used, except that the versions of 3111B, 3111D, 3113B and 3114B in the 20th edition may not be used.

[5] Method I-2601-90, *Methods for Analysis by the U.S. Geological Survey National Water Quality Laboratory – Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments*, Open File Report 93-125, 1993; For Methods I-1030-85; I-1601-85; I-1700-85; I-2598-85, I-2700-85; and I-3300-85 *See Techniques of Water Resources Investigation of the U.S. Geological Survey*, Book 5, Chapter A-1, 3rd edition, 1989; Available from Information Services, U.S. Geological Survey, Federal Center, Box 25286, Denver, CO 80225-0425.

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

[7] The procedure shall be done in accordance with Technical Bulletin 601 *Standard Method of Test for Nitrate in Drinking Water*, July 1994, PN 221890-001, Analytical Technology, Inc. Copies may be obtained from ATI Orion, 529 Main Street, Boston, MA 02129.

[8] Method B-1011, *Standard Method of Test for Nitrate in Drinking Water*, July 1994, PN 221890-001, Analytical Technology, Inc. Copies may be obtained from ATI Orion, 529 Main Street, Boston, MA 02129.

[9] Method 100.1, *Analytical Methods for Determination of Asbestos Fibers in Water*, EPA/600/4-83/043, September 1983, Available at NTIS, PB83-206471.

[10] Method 100.2, *Determination of Asbestos Structures Over 10 µm in Length in Drinking Water*, EPA/600/R-94/134, June 1994. Available at NTIS, PB94-201902.

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

[12] 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 the Method 200.8 using ultrasonic nebulization, samples and standards must contain 1 mg/L of sodium hypochlorite.

[13] [Deleted].

[14] Revision 1.0, November~~,~~ 1999, *Determination of Perchlorate in Drinking Water Using Ion Chromatography* as modified to achieve performance requirements in 310 CMR 22.06(4).

[15] EPA Method 314.1: *Determination of Perchlorate in Drinking Water Using Inline Column Concentration/Matrix Elimination Ion Chromatography with Suppressed Conductivity Detection.*

[16] EPA Method 331.0: *Determination of Perchlorate in Drinking Water by Liquid Chromatography Electrospray Ionization Mass Spectrometry.*

[17] EPA Method 332.0: *Determination of Perchlorate in Drinking Water Using Ion Chromatography with Suppressed Conductivity and Electrospray Ionization Mass Spectrometry.*

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

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

[20] *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.

[21] 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 OL Analytical, P.O. Box 9010, College Station, TX 77842-9010.

[22] Sulfide levels below those detected using lead acetate paper may produce positive method interferences. Test samples using a more sensitive sulfide method to determine if a sulfide interference is present, and treat samples accordingly.

[23] Standard Methods Online ~~are available at http://www.standardmethods.org~~. The year in which each method was approved by the Standards 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.

[24] Method D6508, Rev.2, *Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Electrolyte.*

(b) Analytical Methods for Fluoride: Analyses for fluoride shall be conducted using the following methods:

	Reference (Method Number)				
Methodology	EPA	ASTM [1]	SM [2]	SM Online [8]	Other
Ion Chromatography	300.05	D4327-97	4110B	4110B-00-	
Manual Distillation; Colorimetric SPADNS	300.16		4500F-B,D	4500F-B,D-97	
Manual Electrode		D1179-93,99B	4500F-C	4500F-C-97	
Automated Alizarin fluorine blue - lanthanum with distillation (complexone)			4500F-E		129-71W [3]
Automated ion selective electrode					380-75W E [4]
Capillary Ion Electrophoresis					D6508, Rev. 2 [7]

[1] Annual Book of ASTM Standards, part 31 Water. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

[2] *Standard Methods for the Examination of Water and Wastewater*, 18th, 19th, and 20th edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1992, 1995, and 1998.

[3] *Fluoride in Water and Wastewater, Industrial Method # 129-71W*. Technicon Industrial Systems. December 1972. Copies may be obtained from Bran & Luebbe, 1025 Busch Parkway, Buffalo Grove, IL 60089.

[4] *Fluoride in Water and Wastewater*, Technicon Industrial Systems. February 1976. Copies may be obtained from Bran & Luebbe, 1025 Busch Parkway, Buffalo Grove, IL 60089.

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

[6] *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.

[7] Method 6508, Rev.2, *Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoreses and Chromate Electrolyte*, available from Waters Corp., 34 Maple St., Milford, MA 01757, Telephone: 508/482-2131, Fax: 508/482-3625.

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

…

22.06A: Special Monitoring for Sodium, Reporting and Analytical Methods and Frequency

…

(7) Sodium Analysis Analytical Methods. Analysis for sodium shall be conducted using the following method:

SODIUM ANALYTICAL METHODS

		Reference (Method Number)	
Contaminant	Methodology[4]	EPA[1]	SM[2]
Sodium	Inductively-coupled Plasma	200.7	--
	Atomic absorption; direct aspiration	--	3111B

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

[2] *Standard Methods for the Examination of Water and Wastewater*", 18th and 19th edition, American Public Health Association, 1992 and 1995, only - not the 20th edition.

[3] For approved analytical procedures for metals, the technique applicable to total metals must be used.

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

22.06B: Control of Lead and Copper in Drinking Water

…

(2) Applicability of corrosion control treatment steps to small, medium-size and large water systems.

…

(b) A system is deemed to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in 310 CMR 22.06B if the system satisfies one of the criteria specified in 310 CMR 22.06(2)(b)1. through 3. Any such system deemed to have optimized corrosion control under 310 CMR 22.06B(2)(b), and which has treatment in place, shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the Department determines appropriate to ensure that optimal corrosion control is maintained.

…

3. Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with 310 CMR 22.06B(7) and source water monitoring conducted in accordance with 310 CMR 22.06B(9) that demonstrates for two consecutive six-month monitoring periods that the difference between the 90th percentile tap water lead level computed under 310 CMR 22.06B(1)(c)3. and the highest source water lead concentration, is less than the Practical Quantitation Level (PQL) for lead specified in 310 CMR 22.06B(10)(a)1.b.

…

b. Any water system deemed to have optimized corrosion control in accordance with 310 CMR 22.06B(2)(b)3.~~b.~~ shall continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in 310 CMR 22.06B(7)(c) and collecting the samples at times and locations specified in 310 CMR 22.06B(7)(d)4.d. Any such system that has not conducted a round of monitoring pursuant to 310 CMR 22.06(B)(7)(d) since September 30, 1997, shall complete a round of monitoring pursuant to 310 CMR 22.06B(2)(b)3.b. no later than September 30, 2000.

…

(6) Public Education and Supplemental Monitoring Requirements. All water systems must deliver a consumer notice of lead and copper tap water monitoring results to persons served by the water system at sites that are tested, as specified in 310 CMR 22.06B(6)(c). A water system that exceeds the lead action level based on tap water samples collected in accordance with 310 CMR 22.06B(7) shall deliver the public education materials contained in 310 CMR 22.06B(6)(a) in accordance with the requirements in 310 CMR 22.06B(6)(b). Water systems that exceed the lead and/or copper action level must offer to sample the tap water of any customer who requests it ~~in accordance with 310 CMR 22.06B(6)(c)~~. The system is not required

to pay for collecting or analyzing the sample, nor is the system required to collect and analyze the sample itself.

…

(b) Delivery of Public Education Materials

1. For~~In~~ any Public Water System~~community~~ where such Supplier of Water's consumers reside in any census tract with~~include~~ a minimum of either 5% or 1000 ~~non-English-speaking~~ residents who lack English ~~speak a common~~ language proficiency, such public education materials shall contain information in the language(s) appropriate for each such group of residents regarding the importance of the notice and that it should be translated. If the service area of a Public Water System~~such community~~ includes some or all of any census tract with a minimum of 25% ~~non-English-speaking~~ of residents who lack English ~~speak a common~~ language proficiency, then such public education materials shall also contain a statement in the appropriate language(s) for each such group of residents which includes a telephone number or address where those residents may contact the affected Public Water System to obtain a translated copy of the public education materials or assistance in the appropriate language(s).

~~1. 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. A community water system that exceeds the lead action level on the basis of tap water samples collected in accordance with 310 CMR 22.06B(7), and that is not already conducting public education tasks under 310 CMR 22.06B(6)~~(b)~~, must conduct the public education tasks under 310 CMR 22.06B(6) within 60 days after the end of the monitoring period in which the exceedance occurred:

…

f. In addition to the requirements of 310 CMR 22.06B(6)(b)2.a. through e., systems must implement at least three activities from one or more categories listed in 310 CMR 22.06B(6)(b)2.f.(i) through (~~iv~~ix). The educational content and selection of these activities must be determined in consultation with the Department.

(i) Public Service Announcements.
(ii) Paid advertisements.
(iii) Public Area Information Display.
(iv) E-mails to customers.
(v) Public Meetings.
(vi) Household Deliveries.
(vii) Targeted Individual Customer Contact.
(viii) Direct material distribution to all multi-family homes and institutions.
~~(iv)~~(ix) Other Methods approved by the Department.

…

3. As long as a community water system exceeds the action level, it must repeat the activities pursuant to 310 CMR 22.06B(6)(b)2. as described in 310 CMR 22.06B(6)(b)3.a. through d.

a. A community water system shall repeat tasks contained in 310 CMR 22.06B(6)(b)2.a., b., and ~~d~~f. every 12 months.

…

d. The community water system shall repeat the task in 310 CMR 22.06B(6)(b)2.e. twice every 12 months on a schedule agreed upon with the Department. ~~The Department can allow activities in 310 CMR 22.06B(6)(b)2.e. twice every 12 months on a schedule agreed upon with the Department.~~ The Department can allow activities in 310 CMR 22.06B(6)(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.

…

6. A water system may discontinue delivery of public education materials if the system has met the lead action level during the most recent six-month monitoring period conducted pursuant to 310 CMR 22.06B(7). Such a system shall recommence public education in accordance with 310 CMR 22.06B(6)~~(b)~~6. if it subsequently exceeds the lead action level during any monitoring period.

…

(c) Notification of Results.

…

4. Delivery. 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, a non-transient non-community water 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.

~~4.~~5. Multilingual Requirements. For~~In~~ any Public Water System~~community~~ where ~~a~~such Supplier of Water's consumers reside in any census tract with ~~include~~ a minimum of either 5% or 1000 ~~non-English-speaking~~ residents who lack English~~speak a common~~ language proficiency, the consumer notice shall contain information in the language(s) appropriate for each such group of residents

regarding the importance of the notice and that it should be translated. If the service area of a Public Water Systemsuch community includes some or all of any census tract with a minimum of 25% ofnon-English speaking residents who lack Englishspeak a common language proficiency, then the consumer notice shall also contain a statement in the appropriate language(s) for each such group of residents which includes a telephone number or address where those residents may contact the affected Public Water System to obtain a translated copy of the notice or assistance in the appropriate language(s).

(7) Monitoring Requirements for Lead and Copper in Tap Water.

…

(b) Sample Collection Methods.

…

5. A non-transient non-community water system, or a community water system that meets the criteria of 310 CMR 22.06B(6)(a) and (b)7., that does not have enough taps that can supply first-draw samples, as defined in 310 CMR 22.06B, may apply to the Department in writing to substitute non-first-draw samples. Such systems shall 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 has the discretion to waive the requirement for prior Department approval of non-first-draw sample sites selected by the system, either through State regulation or written notification to the system.

…

(d) Timing of Monitoring

…

3. Monitoring after Department Specifies Water Quality Parameter Values for Optimal Corrosion Control. After the Department specifies the values for water quality control parameters under 310 CMR 22.06B(3)(f), the a large water 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 310 CMR 22.06B(3)(f).

4. Reduced Monitoring.

…

b. Any large water system that meets the lead and copper action levels and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f) during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring for lead and copper to once per year and to reduce the number of lead and copper samples in accordance with 310 CMR 22.06B(7)(c) if it receives written approval from 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 310 CMR 22.06(B)(11), and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring pursuant to 310 CMR 22.06B(7)(d)4. The Department shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

…

g. Any large water system subject to the 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 parameters specified by the Department under 310 CMR 22.06B(3)(f) for more than nine days in any six-month period specified in 310 CMR 22.06B(8)(d) shall conduct tap water sampling for lead and copper at the frequency specified in 310 CMR 22.06B(7)(d)3., collect the number of samples specified for standard monitoring under 310 CMR 22.06B(7)(c), and shall resume monitoring for water quality parameters within the distribution system in accordance with 310 CMR 22.06B(8)(d). This standard tap water sampling shall begin no later than the six-month period beginning January 1st of the calendar year following the lead action level exceedance or water quality parameter excursion. Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

…

(8) Monitoring Requirements for Water Quality Parameters. All large water systems and all small and medium-size systems that exceed the lead or copper action level shall monitor water quality parameters in addition to lead and copper in accordance with 310 CMR 22.06B(8). The requirements of 310 CMR 22.06B(8) are summarized in the table at the end of 310 CMR 22.06B.

(a) General Requirements.

…

2. Number of Samples.

a. Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under 310 CMR 22.06B(8)(b) through (e) from the following number of sites.

System Size (No. of People Served)	No. of Sites for Water Quality Parameters
>100,000	25
10,001-100,000	10
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
~~<~~≤100	1

…

(d) Monitoring after 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 under 310 CMR 22.06B(3)(f) all large systems shall measure the applicable water quality parameters in accordance with 310 CMR 22.06B(8)(c) and determine compliance with the requirements of 310 CMR 22.06B(3)(g) every six months with the first six-month period to begin on either January 1st or July 1st, whichever comes first, after the Department specifies the optimal values under 310 CMR 22.06B(3)(f). Any small or medium-size system shall conduct such monitoring during each six-month period specified in 310 CMR 22.06B(7)(d)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 310 CMR 22.06B(7)(d)4. at the time of the action level exceedance, the start of the applicable six-month monitoring period under 310 CMR 22.06B(8)(d) shall coincide with the ~~end~~ start of the applicable monitoring period under 310 CMR 22.06B(7)(d)4. Compliance with Department-designated optimal water quality parameter values shall be determined as specified under 310 CMR 22.06B(3)(g).

(e) Reduced Monitoring.

1. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment during each of two consecutive six-month monitoring periods under 310 CMR 22.06B(8)(d) shall continue monitoring at the entry point(s) to the distribution system as specified in 310 CMR 22.06B(8)(c)2. Such system may collect two tap samples for applicable water quality parameters from the following reduced number of sites during each six-month monitoring period.

System Size (No. of People Served)	Reduced No. of Sites for Water Quality Parameters
>100,000	10
10,001 to 100,000	7
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
≤100	1

2. a. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f) during three consecutive years of monitoring under 310 CMR 22.06B(8)(e)2.a. may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in 310 CMR 22.06B(8)(e)1., from every six months to annually. This sampling begins during the calendar year immediately following the end of the monitoring period in which the third consecutive year of six-month monitoring occurs. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Department under 310 CMR 22.06B(3)(f), during three consecutive years of annual monitoring under 310 CMR 22.06B(8)(e)2. a. may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in 310 CMR 22.06B(8)(e)1. from annually to every three years. This sampling begins no later than the third calendar year following the end of the monitoring period in which the third consecutive year of monitoring occurs.

…

(10) Analytical Methods.

(a) Analyses for lead, copper, pH, conductivity, calcium, alkalinity, orthophosphate, silica, and temperature shall be conducted using the following methods:

ANALYTICAL METHODS

Contaminant	Methodology[9]	Reference (Method Number) EPA[1]	ASTM[2]	SM[3]	SM Online[11]	USGS[4]	Other
Lead	Atomic absorption; furnace technique		D3559-96, 03D	3113 B	3113 B-99		
	Inductively-coupled plasma; mass spectrometry	200.8					
	Atomic absorption; platform furnace technique	200.9					

ANALYTICAL METHODS (continued)

Contaminant	Methodology[9]	EPA[1]	ASTM[2]	SM[3]	SM Online[11]	USGS[4]	Other
	Heteropoly blue			4500-Si-E (18^{th},19^{th})	4500- SiO_2 D-97		
	Automated method for molybdate-reactive silica			4500-SiO_2 D (20^{th} ed.) 4500-Si- F (18^{th}, 19^{th}) 4500-SiO_2 E (20^{th} ed.)	4500- SiO_2 E-97		
	Inductively-coupled plasma	200.7[5]		3120 B	3120 B-99		
Temperature	Thermometric			2550	2550-00		
	Differential Pulse Anodic Stripping Voltameter						Method 1001[10]
Copper	Atomic absorption; furnace technique		D1688-95, 02C	3113 B	3113 B-99		
	Atomic absorption; direct aspiration		D1688-95, 02A	3111 B	3113 B-99		
	Inductively-coupled plasma	200.7[5]		3120 B	3120 B-99		
	Inductively-coupled plasma; mass spectrometry	200.8[6]					
	Atomic absorption; platform furnace	200.9[7]					
Magnesium	Atomic absorption; furnace		D 511-93 03B	3111 B	3111 B-99		
	ICP	200.7		3120 B	3120B-99		
	Complexation Titrimetric Methods		D 511-93, 3A	3500-Mg E, 3500 Mg B	3500MB-97		
	Ion Chromatography		D6919-03				
pH	Electrometric	150.1 150.2	D1293-95, 99	4500-H^+B	4500- H^+B-00		
Conductivity	Conductance		D1125-95 (Re-approved 1999) A	2510 B	2510 B-97		
Calcium	EDTA titrimetric		D511-93, 03A	3500-Ca D, 3500-Ca B	3500-Ca B-97		
	Atomic absorption; direct aspiration		D511-93, 03B	3111 B	3111 B-99		
	Inductively-coupled plasma	200.7		3120 B	3120 B-99		
Alkalinity	Titrimetric		D1067-92, 02 B	2320 B	2320 B-97		
	Electrometric titration					I-1030-85	
Ortho-phosphate, unfiltered, no digestion or hydrolysis	Colorimetric, automated, ascorbic acid	365.1		4500-P-F			
	Colorimetric, ascorbic acid, single reagent		D515-88 A	4500-P-E			
	Colorimetric, phosphomolybdate; automated-segmented flow; automated discrete					I-1601-85 I-2601-90 I-2598-85	
	Ion Chromatography	300.0[8] 300.1	D4327-97, 03	4110 B	4110 B-00		
	Capillary Ion Electrophoresis		D6508-00				
Silica	Colorimetric, molybdate blue					I-1700-85	
	Automated-segmented flow					I-2700-85	
	Colorimetric		D859-94, 00				
	Molybdosilicate			4500-Si-D (18^{th},19^{th}) 4500-SiO_2 C (20^{th} ed.)	4500-SiO_2 C-97		

1 The procedures 239.2, 220.2, 220.1, 150.1, 150.2, 120.1, 215.2, 310.1, 365.1, 365.3, 365.2, and 370.1 are incorporated by reference and shall be done in accordance with "Methods for Chemical Analysis of Water and Wastes", EPA Environmental Monitoring and Support Laboratory, Cincinnati, OH (EPA-600/4-79-020), Revised March 1983, pp. 239.2-1 through 239.2-2 and metals-1 through metals-19, 220.2-1 through 220.2-2 and metals-1 through metals-19, 220.1-1 through 220.1-2 and metals-1 through metals-19, 150.1-1 through 150.1-3, 150.2-1 through 150.2-3, 120.1-1 through 120.1-3, 215.2-1 through 215.2-3, 215.1-1 through 215.1-2, 310.1-1 through 310.1-3, 365.1-1 through 365.1-9, 365.3-1 through 365.3-4, 365.2-1 through 365.2-6, and 370.1-1 through 370.1-5, respectively. 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 obtained from ORD Publications, CERI, EPA, Cincinnati, OH 45268. Copies may be inspected at the United Departments Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

2 The procedures D3559-96D, D1688-95C, D1688-95A, D1293-95B, D1125-82B, D511-88A, D511-88B, D1067-88B, D515-88A, D4327-97, and D859-88 are incorporated by reference and shall be done in accordance with *Annual Book of ASTM Standards*, 1994, 1996, or 1999, Vols. 11.01 and 11.02, ASTM International; any year containing the cited version of the method may be used. The previous versions of D1688-95A, D1688-95C (copper), D3559-95D (lead), D1293-95 (pH), D1125-91A (conductivity), and D859-94 (silica) are also approved. These previous versions D1688-90A, C; D355990D, D1293-84, D1125-91A and D859-88, respectively are located in the *Annual Book of ASTM Standards*, 1994, Vol. 11.01. Copies may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

3 The procedures 3113, 3111-B, 3120, 4500-H^+, 2510, 3500-Ca-D, 3120, 2320, 4500-P-F, 4500-P-E, 4110, 4500-Si-D, 4500-Si-E, 4500-Si-F, and 2550 are incorporated by reference and shall be done in accordance with *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995) or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005. The cited methods published in any of these three editions may be used, except that the versions of 3111B and 3113B in the 20th edition may not be used. 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 obtained from the American Water Works Association, Customer Services, 6666 West Quincy Avenue, Denver, Co 80235, Phone (303) 794-7711. Copies may be inspected at the United Departments Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

4 The procedures I-1030-85, I-1601-85, I-2601-85, I-2598-85, I-1700-85, and I-2700-85 are incorporated by reference and shall be done in accordance with "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments", 3rd edition, U.S. Department of Interior , U.S. Geological Survey, 1989, pp. 55-56, 381-382, 383-385, 387-388, 415-416, and 417-419, respectively. 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 purchased from the Books and Open-file Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, Co 80225. Copies may be inspected at the United Departments Environmental Protection Agency, 401 M Street, SW., Room EB-15, Washington, D.C. 20460 or at the Office of the Federal Register, 1100 L Street, NW., Room 8401, Washington, D.C.

5 *Determination of Metals and Trace Elements in Water and Wastes by Inductively-Coupled Plasma--Atomic Emission Spectrometry*, Revision 3.3, April 1991, *Methods for the Determination of Metals in Environmental Samples*, Office of Research and Development, Washington, DC 20460, EPA/4-91/010, June 1991.

6 *Determination of Trace Elements in Water and Wastes by Inductively-Coupled Plasma--Mass Spectrometry*, Revision 4.4, April 1991, *Methods for the Determination of Metals in Environmental Samples*, Office of Research and Development, Washington, DC 20460, EPA/600/4-91/010, June, 1991.

7 *Determination of Trace Elements by Stabilized Temperature Graphite Furnace Atomic Absorption Spectrometry*, Revision 1.2, April 1991, *Methods for the Determination of Metals in Environmental Samples*, Office of Research and Development, Washington, DC 20460, EPA/600/4-91/010, June 1991.

8 *Determination of Inorganic Ions in Water by Ion Chromatography*, Method 300.0, December 1989, U.S. EPA EMSL. This document is available from U.S. EPA, EMSL, Cincinnati, OH 45268.

9 For analyzing lead and copper, the technique applicable to total metals shall be used and samples cannot be filtered. Samples that contain less than one NTU (nephelometric turbidity unit) and are properly preserved (conc HNO_3 to pH <2) may be analyzed directly (without digestion) for total metals: otherwise, digestion is required. Turbidity shall be measured on the preserved samples just prior to when metals analysis is initiated. When digestion is required, the "total recoverable" technique as defined in the method shall be used.

10 The description for Method 1001 for lead is available from Palintest, LTD, 21 Kenton Lands Road, P.O. Box 18395, Erlanger, KY 41018, or from the Hach Company, P.O. Box 389, Loveland, CO 80539.

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

1. Analyses under 310 CMR 22.06B~~(9)~~(10) for lead and copper shall only be conducted by laboratories that have been certified by EPA or the Department as stated in 310 CMR 22.11A. To obtain certification to conduct analyses for lead and copper, laboratories shall:

…

2. The Department has the authority to allow the use of previously collected monitoring data for purposes of monitoring, if the data were collected and analyzed in accordance with the requirements of 310 CMR 22.06B~~(10)(a)~~.

…

(11) Reporting Requirements. All water systems shall report all of the following information to the Department in accordance with 310 CMR 22.06B(11).

(a) Reporting requirements for tap water monitoring for lead and copper and for water quality parameter monitoring

1. Except as provided in 310 CMR 22.06B(11)(a)1.~~h~~g., a water system shall report the information specified below for all tap water samples specified in 310 CMR 22.06B(7) and for all water quality parameter samples specified in 310 CMR 22.06B(8) within the first ten days following the end of each applicable monitoring period specified in 310 CMR 22.06B(7) and (8) (*i.e.*, every six-months, annually, every three years, or every nine years). For monitoring periods with a duration less than six months, the end of the monitoring period is the last date samples can be collected during that period as specified in 310 CMR 22.06B(7) and (8).

…

c. the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period (calculated in accordance with 310 CMR 22.06B(1~~1~~)(c)3.), ~~U~~unless the Department calculates the systems 90th percentile lead and copper levels under 310 CMR 22.06B(11)(h);

…

(h) Reporting of 90th Percentile Lead and Copper Concentrations where the Department Calculates a System's 90th Percentile Concentrations. A water system is not required to report the 90th percentile lead

and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period, as required by 310 CMR 22.06B(11)(a)1.~~d~~c. if:

…

(12) Recordkeeping Requirements. Any system subject to the requirements of 310 CMR 22.06B shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, Department determinations, and any other information required by 310 CMR 22.06B(2) through (9). Each water system shall retain the records required by 310 CMR 22.06B for no fewer than 12 years.

Summary of Monitoring Requirements for Water Quality Parameters[1]

Monitoring Period	Parameters[2]	Location	Frequency
Initial Monitoring.	pH, alkalinity, orthophosphate or silica[3], calcium, conductivity, temperature.	Taps and at entry point(s) to distribution system.	Two samples every six months.
After Installation of Corrosion Control.	pH, alkalinity, orthophosphate or silica[3], calcium[4].	Taps.	Two samples every six months.
	pH, alkalinity, dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5].	Entry point(s) to distribution system[6].	No less frequently than every two weeks.
After State Specifies Parameter Values for Optimal Corrosion Control.	pH, alkalinity, orthophosphate or silica[3], calcium[4].	Taps.	Two Samples every six months.
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5].	Entry point(s) to distribution system[6].	No less frequently than every two weeks.
Reduced Monitoring.	pH, alkalinity, orthophosphate or silica[3], calcium[4].	Taps.	Two samples every six months, annually[7] or every three years[8]; reduced number of sites.
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5].	Entry point(s) to distribution system[6].	No less frequently than every two weeks.

[1] Table is for illustrative purposes; consult the text of 310 CMR 22.06B(~~12~~8) for precise regulatory requirements.

[2] Small and medium-size systems have to monitor for water quality parameters only during monitoring periods in which the system exceeds the lead or copper action level.

[3] Orthophosphate shall be measured only when an inhibitor containing a phosphate compound is used. Silica shall be measured only when an inhibitor containing silicate compound is used.

[4] Calcium shall be measured only when calcium carbonate stabilization is used as part of corrosion control.

[5] Inhibitor dosage rates and inhibitor residual concentrations (orthophosphate or silica) shall be measured only when an inhibitor is used.

[6] Ground water systems may limit monitoring to representative locations throughout the system.

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

[8] Water systems may further reduce the frequency of monitoring for water quality parameters at the tap from annually to once every three years if they have maintained the range of values for water quality parameters reflecting optimal corrosion control during three consecutive years of annual monitoring. Water systems may accelerate to triennial monitoring for water quality parameters at the tap if they have maintained 90th percentile lead levels less than or equal to 0.005 mg/L, 90th percentile copper levels less than or equal to 0.65 mg/L, and the range of water quality parameters designated by the Department~~State~~ under 310 CMR 22.06B(3)(f)~~40 CFR 141.82(f)~~ as representing optimal corrosion control during two consecutive six-month monitoring periods.

22.06C: Compliance with Secondary Maximum Contaminant Level and Public Notification for Fluoride

Community water systems sampling pursuant to 310 CMR 22.06 which exceed the secondary maximum contaminant level for fluoride, but do not exceed the maximum contaminant level for fluoride, shall comply with 310 CMR 22.16(4) and 310 CMR 22.16(8).

Secondary Maximum Contaminant Level for Fluoride - 2.0 mg/l

22.07A: Synthetic Organic Chemicals (SOC) Sampling and Analytical Requirements

…

(8) Composite SOC Sampling. The total number of samples which must be analyzed may be reduced by compositing samples. Composite samples from a maximum of five sampling points are allowed provided that the detection limit of the method used for analysis is less than one-fifth of the MCL and none of the samples to be composited are representative of multiple sources. Compositing of samples must be approved by the Department and must be done in the laboratory and analyzed within the holding times specified by EPA-814B-92-002, Change 2 - September 1992 *Manual for the Certification of Laboratories Analyzing Drinking Water*, third edition. Compositing of sources with previous detections greater than the detection limit is not allowed, unless otherwise authorized by the Department.

(a) If the concentration in the composite sample exceeds the detection limit for one or more contaminants listed in 310 CMR 22.07A(1), then a follow-up sample must be taken and analyzed from each sampling point included in the composite~~any~~ within 14 days after completion of the composite analysis or before the holding time of the initial sample is exceeded, whichever is sooner.

…

(10) SOC Analytical Methods. Analysis for the contaminants listed in 310 CMR 22.07A(1) shall be conducted using the following EPA methods or their equivalent as approved by EPA. Methods 508A and 515.1 are contained in *Methods for the Determination of Organic Compounds in Drinking Water*, EPA-600/4-88-039, December 1988, Revised, July 1991, Methods 547, 550 and 550.1 are in, *Methods for the Determination of Organic Compounds in Drinking Water - Supplement I*, EPA/600-4-90-020, July 1990. Methods 548.1, 549.1, 552.1 and 555 are in, *Methods for the Determination of Organic Compounds in Drinking Water - Supplement II*, EPA/600/R-92/129, August 1992. Methods 502.2, 504.1, 505, 506, 507, 508, 508.1, 515.2, 524.2, 525.2, 531.1, 551.1 and 552.2 are in *Methods for the Determination of Organic Compounds in Drinking Water – Supplement III*, EPA/600/R-95-131, August 1995. Method 1613 is titled "Tetra-through Octa-Chlorinated Dioxins and Furans by Isotope-Dilution HRGC/HRMS", EPA/821-B-94-005, October 1994. These documents are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027, PB92-27703, PB95-261616 and PB95-104774 (respectively), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. The phone number is 800-553-6847. The phone number is 513-569-7586. Method 6610 is contained in *Standard Methods for the Examination of Water and Wastewater* 18th Edition Supplement, 1994, or with the 19th edition (1995) or 20th edition (1998), any of these three editions may be used. Method 6651 is contained in *Standard Methods for the Examination of Water and Wastewater* 18th Edition, (1992), 19th edition (1995), or 20th edition (1998); any of these three editions may be used. The APHA documents are available from American Public Health Association, 1015 Fifteenth Street NW, Wash., D.C. 20005. Other required analytical test procedures germane to the conduct of these analyses are contained in Technical Notes on Drinking Water Methods, EPA/600/R-94-173, October 1994, NTIS PB95-104766. EPA Methods 515.3 and 549.2 are available from U.S. Environmental Protection Agency, National Exposure Research Laboratory [NERL]-Cincinnati, 26 West Martin Luther King Drive, Cincinnati, OH 45268 ASTM Methods D 5317-93, 98 (Reapproved 2003) is available in the Annual Book of ASTM Standards, (1999), Vol. 11.02, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428, any edition containing the cited version of the methods may be used. EPA Methods 515.4, "Determination of Chlorinated Acids in Drinking Water by Liquid-Liquid Microextraction, Derivatization and Fast Gas Chromatrography with Electron Capture Detection", Revision 1.0, April 2000, EPA/815/B-00/001 and EPA Methods 552.3, "Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-Liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection", Revision 1.0, July 2003, EPA 815-B-03-002, can be accessed and downloaded directly from the National Environmental Methods Index (NEMI)~~online at http://www.epa/gov/safewater/methods/sourcalt.html~~. Syngenta Method AG-625, "Atrazine in Drinking Water by Immunoassay", February 2001, is available from Syngenta Crop Protection, Inc., 410 Swing Road, P.O. Box 18300, Greensboro, NC 27419. Telephone: 336-632-6000. Method 531.2 "Measurement of N-methylcarbamoyloximes and N-methylcarbamoyloximes and N-methylcarbamates in Water by Direct Aqueous Injection HPLC with Postcolumn Derivatization", Revision 1., September 2001, EPA 815-B-01-002, can be accessed and downloaded directly from NEMI~~online at *http://www.epa.gov/safewater/methods/sourcalt.htmml*.~~

…

(12) Previously Collected~~Grandfathered~~ SOC Data: The Department may allow the use of monitoring data collected after January 1, 1990, for purposes of satisfying the initial monitoring requirement of 310 CMR 22.07A(2), if in the opinion of the Department, the data are generally consistent with the requirements of 310 CMR 22.07A(2). A single sample rather than four quarterly samples may be allowed by the Department to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

…

(16) SOC Detection Limits: Detection as used in 310 CMR 22.07A(5) shall be defined as greater than or equal to the following concentrations for each contaminant. (Please refer to the Guidelines and Policies for further information regarding detection limits).

SOC DETECTION LIMITS

Contaminant	Detection Limit mg/l

Alachlor	0.0002
Aldicarb	0.0005
Aldicarb sulfoxide	0.0005
Aldicarb sulfone	0.0008
Atrazine	0.0001
Benzo(a)pyrene	0.00002
Carbofuran	0.0009
Chlordane	0.0002
Dalapon	0.001
Dibromochloropropane (DBCP)	0.00002
Di (2-ethythexyl) adipate	0.0006
Di (2-ethylhexyl) phthalate	0.0006
Dinoseb	0.0002
Diquat	0.0004
2,4-D	0.0001
Endothall	0.009
Endrin	0.00001
Ethylene dibromide (EDB)	0.00001
Glyphosate	0.006
Heptachlor	0.00004
Heptachlor epoxide	0.00002
Hexachlorobenzene	0.0001
Hexachlorocyclopentadiene	0.0001
Lindane	0.00002
Methoxychlor	0.0001
Oxamyl	0.002
Picloram	0.0001
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	0.0001
Pentachlorophenol	0.00004
Simazine	0.00007
Toxaphene	0.001
2,3,7,8-TCDD (Dioxin)	0.000000005
2,4,5-TP (Silvex)	0.0002

…

(18) New Systems/Sources. Each new supplier of water or supplier of water that uses a new source of water that begins operation after January 22, 2004, must demonstrate compliance with the MCL within a period of time specified by the Department. The supplier of water must also comply with the initial sampling frequencies specified by the Department to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in 310 CMR 22.07A.

22.07B: Maximum Contaminant Levels (MCLs) for Volatile Organic Compounds (VOC)

…

(2) VOC Sampling Requirements. Beginning with the initial compliance period analysis of the contaminants listed in 310 CMR 22.07B(1) for the purpose of determining compliance with the maximum contaminant level the monitoring shall be conducted as follows:

…

(e) Previously Collected VOC ~~Grandfathered~~ Data with No Detects - Reduced Monitoring. If the initial monitoring for contaminants listed in 310 CMR 22.07B(1) as allowed in 310 CMR 22.07B(10), has been completed by December 31, 1992, and the system did not exceed the detection levels in 310 CMR 22.07B(4) for any contaminant listed in 310 CMR 22.07B(1), then each ground and surface water system shall take one sample annually beginning with the initial ~~e~~Compliance ~~p~~Period.

…

(8) VOC Analytical Methods. Analysis for the contaminants listed in 310 CMR 22.07B(1) shall be conducted using the following EPA methods or their equivalent as approved by EPA.

Contaminant	EPA Method
Benzene	502.2, 524.2
Carbon tetrachloride	502.2, 524.2, 551.1
Chlorobenzene	502.2, 524.2
1,2-Dichlorobenzene	502.2, 524.2
1,4- Dichlorobenzene	502.2, 524.2
1,2- Dichloroethane	502.2, 524.2
cis-Dichloroethylene	502.2, 524.2
trans- Dichloroethylene	502.2, 524.2

Dichloromethane	502.2, 524.2
1,2-Dichloropropane	502.2, 524.2
Ethylbenzene	502.2, 524.2
Styrene	502.2, 524.2
Tetrachloroethylene	502.2, 524.2, 551.1
1,1,1-Trichlorobenzene	502.2, 524.2, 551.1
Trichloroethylene	502.2, 524.2, 551.1
Toluene	502.2, 524.2
1,2,4-Trichlorobenzene	502.2, 524.2
1,1-Dichloroethylene	502.2, 524.2
1,1,2-Trichloroethane	502.2, 524.2
Vinyl chloride	502.2, 524.2
Xylenes(total)	502.2, 524.2

(a) Method 502.2 is in *Methods for the Determination of Organic Compounds in Drinking Water*, EPA-600/4-88-039, December 1988, Revised, July 1991.
(b) Method 524.2~~,~~ is in *Methods for the Determination of Organic Compounds in Drinking Water - Supplement III*, EPA/600/R-95/131, August 1995.

…

(10) Previously Collected ~~Grandfathered~~ VOC Data. The Department may allow the use of monitoring data collected after January 1, 1988, for purposes of initial monitoring ~~complying with initial~~ compliance ~~period~~. If the data are generally consistent with the other requirements in 310 CMR 22.07B, the Department may use these data (*i.e.*, a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of 310 CMR 22.07B(2)(d). Systems which use previously collected~~grandfathered~~ samples and did not detect any contaminants listed in 310 CMR 22.07B(1) shall begin monitoring annually in accordance with 310 CMR 22.07B(2)(e) beginning with the initial ~~c~~Compliance ~~p~~Period.

…

(15) New Systems/Sources. Each new supplier of water or supplier of water that use a new source of water that begin operation after January 22, 2004, must demonstrate compliance with the MCL within a period of time specified by the Department. The supplier of water must also comply with the initial sampling frequencies specified by the Department to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in 310 CMR 22.07B.

…

22.07D: Secondary Chemical Standards

(1) Secondary Contaminants. The following contaminant levels apply to every public water systems:

Contaminant	Secondary MCL
(a) Aluminum	0.05 to 0.2 mg/l
(b) Chloride	250 mg/l
(c) Color	15 Color Units
(d) Copper	1 mg/l
(e) Corrosivity	Non-corrosive
(f) ~~-~~Fluoride	2.0 mg/l
(g) Foaming Agents	0.5 mg/l
(h) Iron	0.3 mg/l
(i) ~~-~~Manganese	0.05 mg/l
(j) Odor	3 Threshold Unit Number
(k) pH	6.5 – 8.5
(l) ~~-~~Silver	0.10 mg/l
(m) Sulfate	250 mg/l
(n) Total Dissolved Solids	500 mg/l
(o) ~~-~~Zinc	5 mg/l

…

22.07E: Disinfection Byproducts, Disinfectant Residuals and Disinfection Byproduct Precursors

(1) MCLs for Disinfection Byproducts. The Maximum Contaminant Levels for Disinfection byproducts of 310 CMR 22.07E apply only to Community Water Systems and Non-transient Non-community Water Systems which add a chemical Disinfectant (oxidant) to the water in any part of the drinking water treatment process. The MCLs are as follows:

Disinfection Byproduct	MCL (mg/l)
Total Trihalomethanes (TTHM)	0.080
Haloacetic ~~(~~Acids (Five) (HAA5)	0.060
Bromate	0.010
Chlorite	1.0

…

(2) MRDLs for Disinfectant Residuals. The maximum residual Disinfectant levels for the Disinfectant residuals of 310 CMR 22.07E apply to Community Water Systems and Non-transient Non-community Water Systems which add a chemical Disinfectant (oxidant) to the water in any part of the drinking water treatment process. In addition, the maximum residual Disinfectant level for chlorine dioxide applies to Transient Non-community Water Systems using chlorine dioxide as a Disinfectant or oxidant. The MRDLs are as follows:

Disinfectant Residual	MRDL (mg/l)
Chlorine ~~4.0 (as Cl_2).~~	4.0 (as Cl_2).
Chloramines ~~4.0 (as Cl_2).~~	4.0 (as Cl_2).
Chlorine dioxide	0.8 (as ClO_2).

…

(4) Disinfection Byproducts BATs.

…

(b) The EPA Administrator, pursuant to the federal Safe Drinking Water Act, § 1412, 40 CFR 141, hereby identifies the following as the best technology, Treatment Techniques, or other means available for achieving compliance with the Maximum Contaminant Levels for TTHM and HAA5 identified in 310 CMR 22.07E(1) for all systems that disinfect their source water:

Disinfection byproduct	Best Available Technology
Total Trihalomethanes (TTHM) and Haloacetic ~~(~~Acids (Five) (HAA5).	Enhanced Coagulation or Enhanced Softening, plus GAC10; or nanofiltration with a molecular weight cutoff ≤1000 Daltons; or GAC20

(c) The EPA Administrator, pursuant to the federal Safe Drinking Water Act, § 1412, 40 CFR 141, hereby identifies the following as the best technology, Treatment Techniques, or other means available for achieving compliance with the Maximum Contaminant Levels for TTHM and HAA5 identified in 310 CMR 22.07E(1) for consecutive systems and applies only to the disinfected water that consecutive systems buy or otherwise receive:

Disinfection Byproduct	Best Available Technology
Total Trihalomethanes (TTHM) and Haloacetic ~~(~~Acids (Five) (HAA5).	Systems serving ≥10,000: Improved Distribution System and storage tank management to reduce residence time, plus the use of chloramines for disinfectant residual maintenance
	Systems serving <10,000: Improved Distribution System and storage tank management to reduce residence time.

…

(6) Analytical Requirements.

…

(b) The methods described in 310 CMR 22.07E(6)(c) through (e) are contained within the following documents: EPA Method 552.1 is in *Methods for the Determination of Organic Compounds in Drinking Water - Supplement II*, USEPA, August 1992, EPA/600/R-92/129 (available through the National Technical Information Service (NTIS), PB92-207703). EPA Methods 502.2, 524.2, 551.1, and 552.2 are in *Methods for the Determination of Organic Compounds in Drinking Water - Supplement III*, USEPA, August 1995, EPA/600/R-95/131 (available through the NTIS, PB95- 261616). EPA Method 300.0 is in *Methods for the Determination of Inorganic Substances in Environmental Samples*, USEPA, August 1993, EPA/600/R-93/100 (available through the NTIS, PB94-121811). EPA Methods 300.1 and 321.8 are in Methods for the Determination of Organic and Inorganic Compounds in Drinking Water, Volume 1, USEPA, August 2000, EPA 815-R-00-014 (available through NTIS, PB2000-106981. EPA Method 317.0, Revision 2.0, *Determination of Inorganic Oxyhalide Disinfection By-products in Drinking Water Using Ion Chromatography Incorporating the Addition of a Postcolumn Reagent for Trace Bromate Analysis, USEPA, July 2001, EPA 815-B-01-001, EPA Method 326.0, Revision 1.0, Determination of Inorganic Oxyhalide Disinfection By-products in Drinking Water Using Ion Chromatography Incorporating the Addition of a Suppressor Acidified Postcolumn Reagent for Trace Bromate Analysis*, USEPA, June 2002, EPA 815—R-03-007, EPA Method 327.0, Revision 1.1, "Determination of Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry", USEPA, May 2005, EPA 815-R-05-008 and EPA Method 552.3, Revision 1.0, "Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture Detection,~~-~~" USEPA, July 2003, EPA-815-B-03-002 can be accessed and downloaded directly from the National Service Center for Environmental Publications (NSCEP)~~on line at http://www.epa.gov/safewater/methods/sourcalt.html~~. EPA Method 415.3, Revision 1.1, "Determination of Total Organic Carbon and Specific UV Absorbance at 254 nm in Source Water and Drinking Water", USEPA, February 2005, EPA/600/R-05/055 can be accessed and downloaded directly from NSCEP~~on-line at www.epa.gov/nerlewww/ordmeth.htm~~. Standard Methods 4500–Cl D, 4500–Cl E, 4500–Cl F,

4500–Cl G, 4500–Cl H, 4500–Cl I, 4500–ClO2 D, 4500–ClO2 E, 6251 B, and 5910 B shall be followed in accordance with Standard Methods for the Examination of Water and Wastewater, 19th or 20th Editions, American Public Health Association, 1995 and 1998, respectively. The cited methods published in either edition may be used. Standard Methods 5310 B, 5310 C, and 5310 D shall be followed in accordance with the Supplement to the 19th Edition of Standard Methods for the Examination of Water and Wastewater, or the Standard Methods for the Examination of Water and Wastewater, 20th Edition, American Public Health Association, 1996 and 1998, respectively. The cited methods published in either edition may be used. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005. Standard Methods 4500–Cl D–00, 4500–Cl E–00, 4500–Cl F–00, 4500–Cl G–00, 4500–Cl H–00, 4500–Cl I–00, 4500–ClO2 E–00, 6251 B–94, 5310 B–00, 5310 C–00, 5310 D–00 and 5910 B–00 are available from~~on the~~ Standard Methods Online~~website at http://www.standardmethods.org~~ or at EPA's Water Docket. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only Online versions that are IBR-approved. ASTM Methods D 1253–86 and D 1253–86 (Reapproved 1996) shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials International, 1996 or any ASTM edition containing the IBR-approved version of the method may be used. ASTM Method D1253–03 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials International, 2004 or any ASTM edition containing the IBR-approved version of the method may be used. ASTM Method D 6581–00 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials International, 2001 or any ASTM edition containing the IBR-approved version of the method may be used; copies may be obtained from the American Society for Testing and Materials International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

(c) Disinfection Byproducts.

1. Each Supplier of Water shall measure Disinfection byproducts by the methods (as modified by the footnotes) listed in the following table:

APPROVED METHODS FOR DISNFECTION BYPRODUCT COMPLIANCE MONITORING

Contaminant and methodology[1]	EPA method	Standard Method	SM online[9]	ASTM method[3]
TTHM				
P&T/GC/ElCD& PID	502.2[4]			
P&T/GC/MS	524.2, 524.3[10], 524.4[15]			
LLE/GC/ECD	551.1			
HAA5				
LLE (diazomethane)/GC/ECD		6251 B	6251 B-94 6251 B-07	
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			
Bromate				
Ion chromatography	300.1, 302.0[6, 13]			
Ion chromatography & post column reaction	317.0 Rev. 2.0[6], 326.0[6]			
IC/ICP-MS	321.8[6, 7]			
Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry (IC-ESI-MS/MS)	557[6, 12]			
Chemically Suppressed Ion Chromatography				D 6581-08 A
Electrolytically Suppressed Ion Chromatography				D 6581-08 B
Chlorite				
Amperometric titration		4500-ClO_2 E[11]	4500-ClO_2 E-00[8]	
Spectrophotometry	327.0 Rev 1.1[8]			
Ion chromatography	300.0, 300.1, 317.0 Rev 2.0, 326.0			D 6581-00[3]
Chemically Suppressed Ion Chromatography				D 6581-08 A[14]
Electrolytically Suppressed Ion Chromatography				D 6581-08 B[14]
Chlorite – daily monitoring as prescribed in 310 CMR 22.07E(7)(b)2.a.i				
Amperometric Titration		4500-ClO_2 E[11]		

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

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

[3] Annual Book of ASTM Standards, 2001 or any year containing the cited version of the method, Vol 11.01.
[4] If TTHMs are the only analytes being measured in the sample, then a PID is not required.
[5] The samples must be extracted within 14 days of sample collection.
[6] Ion chromatography & post column reaction or IC/ICP-MS must be used for monitoring of bromate for purposes of demonstrating eligibility of reduced monitoring, as prescribed in 310 CMR 22.07E(7)(b)3.b.
[7] Samples must be preserved at the time of sampling with 50 mg ethylenediamine (EDA)/L of sample and must be analyzed within 28 days.
[8] Amperometric titration may be used for routine daily monitoring of chlorite at the entrance to the Distribution System, as prescribed in 310 CMR 22.07E(7)(b)2.a.i. Ion chromatography shall be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the Distribution System, as prescribed in 310 CMR 22.07E(7)(b)2.a.ii. and (b)2.b.
[9] The Standard Methods Online version that is approved is indicated by the last two digits in the method number which is the year of approval by the Standard Method Committee. ~~Standard Methods Online are available at http://www.standardmethods.org.~~
[10] 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 from NSCEP~~at http://epa.gov/safewater/methods/analyticalmethods_ogwdw.html~~.
[11] 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.
[12] 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 from NSCEP~~at http://epa.gov/safewater/methods/analyticalmethods_ogwdw.html~~.
[13] EPA Method 302.0. *Determination of Bromate in Drinking Waters using Two-dimensional Ion Chromatography with Suppressed Conductivity Detection*, September 2009. EPA 815-B-09-014. Available from NSCEP~~at http://epa.gov/safewater/methods/analyticalmethods_ogwdw.html~~.
[14] Available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 ~~or http://astm.org~~. The methods listed are the only alternative versions that may be used.
[15] EPA Method 524.4, Version 1.0. *Measurement of Purgeable Organic Compounds in Water by Gas Chromatography/Mass Spectrometry using Nitrogen Purge Gas*, May 2013. EPA 815-R-13-002. Available from NSCEP~~at http://water.epa.gov/drink~~.

…

(d) Disinfectant Residuals.

1. Each Supplier of Water shall measure the Residual Disinfectant Concentration for free chlorine, combined chlorine (chloramines), and chlorine dioxide by the methods listed in the following table:

Methodology	Standard Method (19th, 20th or 21st editions)	SM Online[2]	EPA method	ASTM Method	Residual Measured[1]			
					Free Cl_2	Combined Cl_2	Total Cl_2	ClO_2
Amperometric Titration	4500-Cl D	4500-Cl D-00		D 1253-86 (96), 03 D 1253-08[4]	X	X	X	
Low Level Amperometric Titration	4500-Cl E	4500-Cl E-00					X	
DPD Ferrous Titrimetric	4500-Cl F	4500-Cl F-00			X	X	X	
DPD Colorimetric	4500-Cl G	4500-Cl G-00			X	X	X	
Syringaldazine (FACTS)	4500-Cl H	4500-Cl H-00			X			
Iodometric Electrode	4500-Cl I	4500-Cl I-00					X	
DPD	4500-ClO_2 D							X
Amperometric Method II	4500-ClO_2 E	4500-ClO_2 E-00						X
Lissamine Green Spectrophotometric			327.0 Rev 1.1					X
Amperometric Sensor - ChloroSense[5]					X		X	
On-line Chlorine Analyzer			334.0[6]		X		X	

[1] X indicates method is approved for measuring specified Disinfectant residual. Free chlorine or total chlorine may be measured for demonstrating compliance with the chlorine MRDL and combined chlorine, or total chlorine may be measured for demonstrating compliance with the chloramine MRDL.
[2] The Standard Methods Online version that is approved is indicated by the last two digits in the method number which is the year of approval by the Standard Method Committee. ~~Standard Methods Online are available at http://www.standardmethods.org.~~
[3] Cl_2 = Chlorine, ClO_2 = Chlorine Dioxide.
[4] Available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 ~~or http://astm.org~~. The methods listed are the only alternative versions that may be used.
[5] ChloroSense. *Measurement of Free and Total Chlorine in Drinking Water by Palintest ChloroSense*, September 2009. Available on the National Environmental Methods Index ~~at http://www.nemi.gov~~ or from Palintest Ltd, 21 Kenton Lands Road, P.O. Box 18395, Erlanger, KY 41018.

[6] 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 from NSCEP~~at http://epa.gov/safewater/methods/analyticalmethods_ogwdw.html~~.

…

(7) Monitoring Requirements.

…

(b) Monitoring Requirements for Disinfection Byproducts.

1. TTHM and HAA5.

…

c. Monitoring Requirements for Source Water TOC. In order to qualify for reduced monitoring for TTHM and HAA5 under 310 CMR 22.07E(7)(b)1.b, Surface Water and Groundwater Under the Direct Influence of Surface Water systems not monitoring under the provisions of 310 CMR 22.07E(7)(d) must take monthly TOC samples every 30 days at a location prior to any treatment, beginning April 1, 2008 or earlier, if specified by the Department. In addition to meeting other criteria for reduced monitoring in 310 CMR 22.07E(7)(b)1.b., the source water TOC Running Annual Average must be ≤ 4.0 mg/L (based on the most recent four quarters of monitoring) on a continuing basis at each treatment plant to reduce or remain on reduced monitoring for TTHM and HAA5. Once qualified for reduced monitoring for TTHM and HAA5 under 310 CMR 22.07E(7)(b)1.b., a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to any treatment.

…

3. Bromate.

…

b. Reduced Monitoring.

…

ii. Beginning April 1, 2009, each Supplier of Water may no longer use the provisions of 310 CMR 22.07E(7)(b)3.b.i. to qualify for reduced monitoring. A Supplier of Water required to analyze for bromate may reduce monitoring from monthly to quarterly, if the system's Running Annual Average bromate concentration is ≤ 0.0025 mg/L based on monthly bromate measurements under 310 CMR 22.07E(7)(b)3.a. for the most recent four quarters, with samples analyzed using Method 302.0, 317.0 Revision 2.0, 326.0, 321.8 or 557. If a Supplier of Water has qualified for reduced bromate monitoring under 310 CMR 22.07E(7)(b)3.b.i. that Supplier of Water may remain on reduced monitoring as long as the Running Annual Average of quarterly bromate samples is 0.0025 mg/L based on samples analyzed using Method 302.0, 317.0 Revision 2.0, 326.0, 321.8 or 557. If the Running Annual Average bromate concentration is >0.0025 mg/L, the Supplier of Water must resume routine monitoring required by 310 CMR 22.07E(7)(b)3.a.

…

22.07F: Stage 2 Disinfection Byproducts Requirements (DBPR)

…

(11) Additional Requirements for Consecutive Systems. If the Supplier of Water is a consecutive system that does not add a Disinfectant but delivers water that has been treated with a primary or residual Disinfectant other than ultraviolet light, they must comply with analytical and monitoring requirements for chlorine and chloramines in 310 CMR 22.07E(6)(c) and (7)(c)1. and the compliance requirements in 310 CMR 22.07E(8)(c)1. beginning April 1, 2009, unless required earlier by the Department, and report monitoring results under 310 CMR 22.07E(9)(c).

…

(14) Requirements for Remaining on Reduced TTHM and HAA5 Monitoring Based on Results Required under 310 CMR 22.07E. The Supplier of Water may remain on reduced monitoring after the dates identified in 310 CMR 22.07F(7)(c) for compliance with 310 CMR 22.07F~~(14)~~ only if they qualify for a 40/30 certification under 310 CMR 22.07F(4) or have received a very small system waiver under 310 CMR 22.07F(5), plus they meet the reduced monitoring criteria in 310 CMR 22.07F(10)(a), and they do not change or add monitoring locations from those used for compliance monitoring under 310 CMR 22.07E. If the Supplier of Water's monitoring locations under 310 CMR 22.07F differ from their monitoring locations under 310 CMR 22.07E, they may not remain on reduced monitoring after the dates identified in 310 CMR 22.07F(7)(c) for compliance with 310 CMR 22.07F.

…

22.07G: Per- and Polyfluoroalkyl Substances (PFAS) Monitoring and Analytical Requirements

…

(7) PFAS Detections.

…

(e) Public Education. Any Supplier of Water subject to 310 CMR 22.07G(7), where there has been a PFAS Detection and the average of such detection and an associated Confirmatory Sample exceeds the PFAS6 MCL, shall provide public education materials regarding the exceedance in accordance with the following requirements:

…

4. for~~in~~ any Public Water System~~community~~ where such Supplier of Water's consumers reside in any census tract with~~include~~ a minimum of either 5% or 1000 ~~non-English speaking~~ residents who lack English ~~speak a common~~ language proficiency, such~~:~~ public education materials shall contain

information in the language(s) appropriate for each such group of residents regarding the importance of the notice and that it should be translated. If the service area of a Public Water System~~such community~~ includes some or all of any census tract with a minimum of 25% of~~non-English speaking~~ residents who lack English~~speak a common~~ language proficiency, then such public education materials shall also contain a statement in the appropriate language(s) for each such group of residents which includes a telephone number or address where those residents may contact the affected Public Water System to obtain a translated copy of the public education materials or assistance in the appropriate language(s);

~~a. either:~~

~~i.10% or more non-English speaking residents who speak a common language; or~~

~~ii.more than 1000 non-English speaking residents who speak a common language, such materials must contain information in the language(s) appropriate for each such group of residents regarding the importance of the notice.~~

~~b. 25% or more non-English speaking residents who speak a common language, such materials must contain a statement in the appropriate language(s) for each such group of residents which includes a telephone number or address where those residents may contact the affected Public Water System to obtain a translated copy of the materials or assistance in the appropriate language(s).~~

…

(12) PFAS Analytical Requirements.

(a) Methods of Analysis. Analysis for PFAS listed in 310 CMR 22.07G(3)(c) shall be conducted using ~~either~~ any of the following EPA methods:

~~Method 537. *U.S. Environmental Protection Agency September 2009. Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). Ver. 1.1 EPA Document #: EPA/600/R-08/092;* or~~

1. Method 537.1. *U.S. Environmental Protection Agency November 2018. Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). Ver. 1.0. EPA Document #: EPA/600/R-18/352;*

~~1.~~2. Method 537.1. *U.S. Environmental Protection Agency March 2020. Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). Ver. 2.0. EPA Document #: EPA/600/R-20/006;* or

3. Method 533. *U.S. Environmental Protection Agency November 2019. Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry. EPA Document # 815-B-19-020.*

…

22.08: Maximum Turbidity Contaminant Levels, Monitoring Requirements and Analytical Methods for Unfiltered Systems and for Filtered Systems Not in Compliance with 310 CMR 22.20A

…

(2) All analyses shall be conducted in accordance with the following methods:

(a) Nephelometric Method 2130B, "Standard Methods for the Examination of Water and Wastewater", American Public Health Association, 14th Edition, pages 132-4, 18th, edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005. The cited methods published in any of these three editions may be used. In addition, the following Standard Methods O~~o~~nline versions may also be used: 2130 B-01, 9215 B-00, 9221 A, B, C, E-99, 9222A, B, C, D-97 and 9223 B-97~~. Standard Methods Online are available at http://www.standardmethods.org~~. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only Online versions that may be used; or

…

22.09A: Maximum Radionuclide Contaminant Levels, Monitoring Requirements and Analytical Methods Effective as of December 8, 2003

…

(2) Monitoring Frequency and Compliance Requirements for Radionuclides in Community Water Supplies.

…

(b) Initial Monitoring. The supplier of water must conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:

1. Systems without acceptable historical data, as defined in 310 CMR 22.09A(2)(b)1. through 4., must collect four consecutive quarterly samples at all sampling points before December 31, 2007.

2. Previously Collected~~Grandfathering of~~ Data. The Department may allow historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point, for the following situations.

…

(5) Analytical Methods for Radioactivity.

(a) Analysis for the following contaminants shall be conducted to determine compliance with 310 CMR 22.09A(1) in accordance with the methods in 310 CMR 22.09A: *Table F* or their equivalent as determined by USEPA.

TABLE F
ANALYTICAL METHODS FOR RADIONUCLIDE MONITORING

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 & beta[11]	Evaporation	900	p 1	0	p 1	302, 7110 B, 7110 B-00		R–1120–76		
Gross alpha[11]	Co-precipitation			0		7110 C, 7110 C-00				
Radium 226	Radon emination	903.1	p 16	Ra-04	p 19	305, 7500-Ra C, 7500 Ra C-01	D3454–97	R–1141–76	Ra-04	N.Y.[9]
	Radiochemical	903	p 13	Ra-03		304, 7500-Ra B, 7500-Ra B-01	D2460–97	R–1140–76		GA[14]
Radium 228	Radiochemical	904.4	p 24	Ra-05	p 19	7500-Ra D, 7500-Ra D-01		R–1142–76		N.Y.[9], N.J.[10], GA[14]
Uranium[12]	Radiochemical	908				7500-U B, 7500-U B-00				
	Fluorometric	908.1				7500-U C (17th Ed.)	D2907–97	R–1180–76, R–1181–76	U-04	
	Alpha spectrometry			00-07	p 33	7500-U C (18th, 19th, or 20th edition) 7500-U C-00	D3972–97, 02	R–1182–76	U-02	
	Laser phosphorimetry						D5174–97, 02			
	ICP-MS	200.8[13]				3125	D5673-03			
Man-made:										
Radioactive cesium	Radiochemical	901.0	p 4			7500-Cs B, 7500-Cs B-00	D2459–72	R–1111–76		
	Gamma ray spectrometry	901.1			p 92	7120, 7120-97	D3649–91, 98a	R–1110–76	4.5.2.3	
Radioactive iodine	Radiochemical	902	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	D3649–91, 98a			
	Gamma ray spectrometry	901.1			p 92	7120, 7120-97	D4785–93, 00a		4.5.2.3	
Radioactive Strontium 89, 90	Radiochemical	905	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	p 34	H-02	p 87	306,7500–^{3}H B, 7500-^{3}H B-00	D4107–91, 98 (Reapproved 2002)	R–1171–76		
Gamma emitters	Gamma ray Spectrometry	901.1, 902.0, 901.0			p 92	7120, 7120-97, 7500-Cs B, 7500-Cs B-00, 7500-I B, 7500-I B-00	D3649–91, 98a, D4785–88, 93, 00a	R–1110–76	Ga-01-R	

1 *Prescribed Procedures for Measurement of Radioactivity in Drinking Water*, EPA 600/4–80–032-, August 1980. Available at U.S. Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (Telephone 800–553–6847), PB 80–224744, except Method 200.8, "*Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry*", Revision 5.4, which is published in "*Methods for the Determination of Metals in Environmental Samples-Supplement I*", EPA 600-R-94-111, May 1994. Available at NTIS, PB95-125472.

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

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

4 *Radiochemical Analytical Procedures for Analysis of Environmental Samples*, U.S. Department of Energy, 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 editions, 1971, 1989, 1992, 1995 and 1998. Available at American Public Health Association, 1015 Fifteenth Street N.W., Washington, D.C. 20005. Methods 302, 303, 304, 305 and 306 are only in the 13th edition. Methods 7110B, 7500-Ra B, 7500-Ra C, 7500-Ra D, 7500-U B, 7500-Cs B, 7500-I B, 7500–I C, 7500–I D, 7500-Sr B, 7500–3H B are in the 17th, 18th, 19th, and 20th editions. Method 7110C is in the 18th, 19th, and 20th editions. Method 7500-U C Fluorometric Uranium is only in the 17th Edition, and 7500-U C Alpha spectrom-etry is only in the 18th, 19th, and 20th editions. Method 7120 is only in the 19th and 20th editions. Methods 302, 303, 304, 305 and 306 are only in the 13th edition. Method 3125 is only in the 20th edition. 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, 7500-1 B-00, 7500-1 C-00, 7500-1 D-00, 7120-97, 7500-Sr B-01, and 7500-^{3}H B-00 are available from Standard Methods Oonline ~~at http://www.standardmethods.org~~. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

[6] Annual Book of ASTM Standards, Vol. 11.01 and 11.02, 1999, 2002; American Society for Testing and Materials International; any year containing the cited version of the method may be used. Copies of these two volumes and the 2003 version of D 5673-03 may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

[7] *Methods for Determination of Radioactive Substances in Water and Fluvial Sediments*, Chapter A5 in Book 5 of Techniques of Water-Resources Investigations of the United States Geo-logical Survey, 1977. Available at U.S. Geological Survey Information Services, Box 25286, Federal Center, Denver, CO 80225–0425.

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

[9] *Determination of Ra-226 and Ra-228 (Ra-02)*, January 1980; Revised June 1982. Available at Radiological Sciences Institute 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-particle activity calibration standards for the gross alpha co-precipitation and evaporation methods; americium-241 is approved for use with the gross alpha co-precipitation methods.

[12] If uranium (U) is determined by mass-type methods (*i.e.*, fluorometric or laser phosphorimetry), a 0.67 pCi/mg uranium conversion factor must be used. This conversion factor is conservative and is based on the 1:1 activity ratio of U-234 to U-238 that is characteristic of naturally-occurring uranium in rock.

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

(b) To determine compliance with 310 CMR 22.09A(1) the detection limit shall not exceed the concentrations as indicated in 310 CMR 22.09A *Table G*.

TABLE G
REQUIRED REGULATORY DETECTION LIMITS FOR VARIOUS RADIOCHEMICAL CONTAMINANTS

Contaminant	**Detection Limit (pCi/L)**
Gross alpha	3
Gross beta	4
Radium-226	1
Radium-228	1
Uranium	1 ~~{~~ug/L~~}~~
Cesium-134	10
Strontium-89	10
Strontium-90	2
Iodine-131	1
Tritium	1000
Other radionuclides and Photon/Gamma Emmitters	1/10th of the rule

…

22.10: Alternative Analytical Methods

…

(2) The Department shall approve all USEPA Alternative Testing Methods approved for analyses under the Safe Drinking Water Act that are identified in 40 CFR 141, Subpart C,

Appendix A. These methods are also listed on the Electronic Code of Federal Regulations (eCFR) provided by the U.S. National Archives and Records Administration~~at http://www.ecfr.gov/cgi-bin/text-idx?SID=fda778b5ffa108853e7f2eb78b656e5a&mc=true&node=sp40.23.141.e&rgn=div6#ap40.23.141.129.a~~. The use of these alternative analytical techniques shall not alter the frequency of monitoring required by 310 CMR 22.00 and laboratories seeking to use the methods must comply with all requirements of 310 CMR 42.00: *Certification and Operation of Environmental Analysis Laboratories*.

22.11A: Laboratory Certification

…

22.11B: Public Water Systems Certified Operator Staffing Requirements

…

(4) Classification of Public Water Systems. A Public Water System's Distribution System shall be classified in accordance with 310 CMR 22.11B(4)(c) and its Treatment Facilities, if any, shall be classified in accordance with 310 CMR 22.11B(4)(a). However, if the Public Water System is a free standing vending machine, it shall be classified instead in accordance with 310 CMR 22.11B(4)(b) or (d), as applicable. The overall classification of each Public Water System shall be indicated by the classification of its Distribution System followed by the numerically highest class of its Treatment Facilities, if any (*e.g.*, III-D/II-T) or its vending classification (*e.g.*, II-VNDT). The increasing numerical class indicates an increasing complexity of operation and a higher level of training, knowledge, and experience required for operation. The certification grades for operators established in 236 CMR 3.02: *Classification of Public Water System Operators*, shall correspond to the classification of the system as required under 310 CMR 22.11B(4). The Department shall make the final determination of all such classifications.

a. Rating Treatment Facilities. The class of each Treatment Facility within a Public Water System shall be established by adding together all rating values reflecting the complexity of operation for such Treatment Facility's treatment units, as set forth in 310 CMR 22.11B: *Table 1. Treatment Unit Rating Values*.

310 CMR 22.11B: *TABLE 1*
TREATMENT UNIT RATING VALUES

Item	**Points Possible**
Size (20 points maximum allowed)	
Design flow average day, or peak month's average day, whichever is larger (1 point per 0.5 MGD. Round up.) Design flow: Consider this to be the design capacity of the plant. Examples: 9.2 MGD = 19 points 4.7 MGD = 10 points	1 - 20
Water Supply Sources (Rating based on public health significance)	
Seawater/saltwater	0
Groundwater	0
Groundwater Under Direct Influence of Surface Water (GWUDI)	8
Surface Water	10
Average Raw Water Quality Variation - Applies to all sources (surface and groundwater) Key is the effect on treatment process changes that would be necessary to achieve optimized performance. • Little or no variation - no treatment provided except Disinfection (0 points) • Minor variation - *e.g.* "high quality" surface source appropriate for Slow Sand Filtration (1 point) • Moderate variation in chemical feed, dosage changes made: monthly (2 points), weekly (3 points), or daily (4 points) • Variation significant enough to require pronounced and/or very frequent changes (5 points) • Severe variation - source subject to non-point discharges, agricultural/ urban storm runoff, flooding (7 points) • Raw Water quality subject to agricultural or municipal waste point source discharges (8 points) • Raw Water quality subject to industrial waste pollution (10 points)	0 - 10
Raw Water quality is subject to:	
• Taste and/or odor for which treatment process adjustments are routinely made - ***see* exceptions in Note 1 at end of table**	2
• Color > 15 CU (not due to precipitated metals) - ***see* exceptions in Note 1 at end of table**	3
• Iron or/and manganese > SMCL: Fe (2 points), Mn (3 points) (3 points maximum allowed) - ***see* exceptions in Note 1 at end of table**	2 - 3
• Algal growths for which treatment process adjustments are routinely made - ***see* exceptions in Note 1 at end of table**	3

Item	**Points Possible**

Chemical Treatment/Addition Processes	
Fluoridation	4

Disinfection/Oxidation (Note: Points are additive to a maximum of 15 points allowed for this category.)
• Chlorination:
  ○ Hypochlorites (5 points)
  • If generated on site (add 1 point)
  ○ Chlorine gas (8 points)
  ○ Chloramination (10 points)
  ○ Chlorine dioxide (10 points)
• Ozonation (10 points)
• UV Irradiation (2 points)
• Iodine, Peroxide, or similar (5 points)
• Potassium permanganate (4 points)
  ○ (If used with green sand filtration do not give 4 points)
	0 - 15

pH adjustment for process control (*e.g.*, pH adjustment aids Coagulation)	4
Stability or Corrosion Control (If the same chemical is used for both Corrosion Control and pH adjustment, count points only once)	4
Coagulation/Flocculation & Filter Aid	
Primary coagulant addition	6
Coagulant aid / Flocculant chemical addition (in addition to primary coagulant use)	2
Flocculation	2
Filter aid addition (Non-ionic/anionic polymers)	2
Clarification/Sedimentation	
Sedimentation (plain, tube, plate)	4
Contact Adsorption	6
Other clarification processes (air flotation, ballasted clarification, *etc.*)	6
Upflow clarification ("sludge blanket clarifier") - ***see* Note 2 at end of table**	8
Filtration	
Granular media filtration (Surface Water/GW UDI) less than or equal to 3 gpm/sq ft	10
Granular media filtration (Surface Water/GW UDI) greater than 3 gpm/sq ft	20
Groundwater Filtration	6
Membrane Filtration • For compliance with a primary MCL, Treatment Technique, MRDL, Action Level or any standards specific to an individual Public Water System established pursuant to a health assessment as provided in 310 CMR 22.03(8) (10 points) • For compliance with a Secondary MCL regulation (6 points)	6 - 10
Diatomaceous Earth (pre-coat filtration)	10
Cartridge/bag	5
Pre-filtration (staged cartridges, pressure sand w/o Coagulation, *etc.*): add one point per stage to maximum of 3 points	1 - 3
Slow sand	5

Item	**Points Possible**
Other Treatment Processes	
Aeration	3
Air stripping (including diffused air, packed tower Aeration)	5
Ion-exchange/softening	5
Green sand Filtration	10
Lime-soda ash softening (includes: chemical addition, mixing/flocculation/clarification/Filtration - do not add points for these processes separately)	20
Granular activated carbon filter (do not assign points when included as a bed layer in another filter)	5
Powdered activated carbon	2
Blending sources with significantly different water quality • To achieve MCL, MRDL, Action Level or any standards specific to an individual Public Water System established pursuant to a health assessment as provided in 310 CMR 22.03(8) (4 points) • For aesthetic reasons (2 points)	2 - 4
Reservoir management employing chemical addition	2
Electrodialysis	15
Other: The Department may assign 2 to 15 additional points for processes not listed elsewhere in this table.	2 – 15
Residuals Disposal	

• Discharge to surface, sewer, or equivalent (0 points) • On-site disposal, land application (1 point) • Discharge to lagoon/drying bed, with no recovery/recycling - e.g. downstream outfall (1 point) • Backwash recovery/recycling: discharge to basin or lagoon and then to source (2 points) • Backwash recovery/recycling: discharge to basin or lagoon and then to Plant Intake (3 points)	0 - 3
Facility Characteristics	
Instrumentation - Use of SCADA or similar instrumentation systems to provide data, with: • Monitoring/alarm only, no process operation - plant has no automated shutdown capability (0 points) • Limited process operation - e.g. remote shutdown capability (1 point) • Moderate process operation - alarms and shutdown, plus partial remote operation of plant (2 points) • Extensive or total process operation - alarms and shutdown, full remote operation of plant possible (4 points)	0 - 4

Notes:

1. Raw Water quality is subject to:
   - Taste and/or odor for which treatment process adjustments are routinely made (2 points): 1) taste and/or odor issue has been identified in a pre-design report, *etc*., 2) a process has been installed to address, and 3) operational control adjustments are made at least seasonally. Do not give points for taste and/or odor when there is no specific additional impact on operation. *E.g*. if a system is already pre-chlorinating for Disinfection, give no points for taste and/or odor.
   - Color > 15 CU (not due to precipitated metals) (3 points) with following exceptions. Color will be considered elevated and points assigned when levels exceed 75 Color Units (CU) for conventional filtration, 40 CU for Direct Filtration, or 15 CU for all other technologies, except Reverse Osmosis (no points given for color for Reverse Osmosis).
   - Iron and/or manganese > SMCL: Fe (2 points), Mn (3 points) (3 points maximum allowed) with following exceptions. Iron and manganese levels will be considered elevated and points assigned if they are greater than the SM CL, except for applications of manganese greensand filters. For applications of manganese greensand filters, iron and manganese levels will be considered elevated when their combined level exceeds 1.0 mg/L or if manganese exceeds 0.3 mg/L (3 points allowed).
   - Algal growths for which treatment process adjustments are routinely made (3 points): Raw Water will be considered subject to algae growths when treatment processes are specifically adjusted due to the presence of high levels of algae on at least a weekly basis for at least two months each year.
2. Upflow clarification ("sludge blanket clarifier") - 8 points - Also known as sludge blanket clarification. Includes such proprietary units as Super-Pulsator. These units include processes for flocculation and Sedimentation. Important note: these are not the same as Adsorption clarifiers.

~~3.~~1. Each unit process should have points assigned only once.

~~4.~~2. Point System: Treatment Facilities shall be classified according to the following points system:

Class I-T____-30 ~~Points~~ points and less
Class II-T___-31 to 55 points
Class III-T___-56 to 75 points
Class IV-T__-76 points and greater

…

(5) Exemptions. The Department may exempt any Supplier of Water from the requirements of 310 CMR 22.11B(1) and (2).

…

(i) Very Small Systems and Non-community Water Systems.

~~1.~~ ~~A~~ A Secondary Operator is not required for Public Water Systems classified as a very small system (VSS), Transient Non-community or Non-transient Non-community Water Systems. However, during the times when the Primary Operator is temporarily absent (*i.e*., absences not exceeding 30 days), a Certified Operator who has a certification which corresponds to the class of the facility or higher shall be retained during the absence of the Primary Operator to respond in the event of an Emergency. In no event shall an Emergency response time greater than one hour be deemed reasonable.

~~2.~~1. ~~n no event shall an Emergency response time greater than one hour be deemed reasonable.~~

…

22.13: Variances

…

(7) Best Available Technologies (BATs).

(a) BATs for Organic Compounds. The following technologies listed in 310 CMR 22.13(7)(a)1. through 54. are identified by the EPA Administrator, pursuant to the federal Safe Drinking Water Act, § 1415(a) (1)(A), (effective August 6, 1996) as the best technology, Treatment Techniques, or other means available for achieving compliance with the Maximum Contaminant Levels for organic chemicals as listed in 310 CMR 22.07A(1) and 22.07B(1).

Contaminant		Best Available Technologies PTA[1]	GAC[2]	OX[3]
1.	Benzene	X	X	
2.	Carbon tetrachloride	X	X	
3.	1,2-Dichloroethane	X	X	
4.	Trichloroethylene	X	X	
5.	para-Dichlorobenzene	X	X	
6.	1,1-Dichloroethylene	X	X	
7.	1,1,1-Trichloroethane	X	X	

8.	Vinyl chloride	X		
9.	cis-1,2-Dichloroethylene	X	X	
10.	1,2-Dichloropropane	X	X	
11.	Ethylbenzene	X	X	
12.	Monochlorobenzene	X	X	
13.	o-Dichlorobenzene	X	X	
14.	Styrene	X	X	
15.	Tetrachloroethylene	X	X	
16.	Toluene	X	X	
17.	trans-1,2-Dichloroethylene	X	X	
18.	Xylenes (total)	X	X	
19.	Alachlor		X	
20.	Aldicarb		X	
21.	Aldicarb sulfoxide		X	
22.	Aldicarb sulfone		X	
23.	Atrazine		X	
24.	Carbofuran		X	
25.	Chlordane		X	
26.	Dibromochloropropane	X	X	
27.	2,4-D		X	
28.	Ethylene dibromide	X	X	
29.	Heptachlor		X	
30.	Heptachlor epoxide		X	
31.	Lindane		X	
32.	Methoxychlor		X	
33.	PCBs		X	
34.	Pentachlorophenol		X	
35.	Toxaphene		X	
36.	2,4,5-TP		X	
37.	Endrin		X	
38.	Benzo(a)pyrene		X	
39.	Dalapone		X	
40.	Dichloromethane		X	
41.	Di(2-ethylhexyl)adipate	X	X	
42.	Di(2-ethylhexyl)phthalate		X	
43.	Dinoseb		X	
44.	Diquat		X	
45.	Endothall		X	
46.	Glyphosate			X
47.	Hexachlorobenzene		X	
48.	Hexachlorocyclopentadiene	X	X	
49.	Oxamyl		X	
50.	Picloram		X	
51.	Simazine		X	
52.	1,2,4-Trichlorobenzene	X	X	
53.	1,1,2-Trichloroethane	X	X	
54.	2,3,7,8-TCDD(Dioxin)		X	

[1] Packed Tower Aeration
[2] Granular Activated Carbon
[3] Oxidation (Chlorination or Ozonation)

…

(8) No variances from the requirements set forth in 310 CMR 22.20A are allowed.

(9) No variances from the Maximum Contaminant Level for *E. coli* in 310 CMR 22.05(8) are allowed.

22.13A: Small System Variances

For compliance with a requirement specifying a Maximum Contaminant Level or treatment technique contained in a 310 CMR 22.00.

(1) Size of Public Water System Eligible For A Small System Variance.
   (a) The Department may grant a small system variance to a Public Water System serving:
      1. 3,300 persons or fewer, or
      2. more than 3,300 persons but fewer than 10,000 persons, with approval of the Administrator.

…

(2) Small System Variances Availability.

…

(b) A small system variance under 310 CMR 22.13A is otherwise only available for compliance with the requirement specifying a Maximum Contaminant Level or Treatment Technique for a contaminant with respect to which;

1. a national primary drinking water regulations was promulgated on or after January 1, 1986; and

…

22.14: Exemptions

…

(7) In the Department's consideration of whether the public water system is unable to comply due to compelling factors pursuant to 310 CMR 22.14, the Department shall consider such factors as the following:

(a) Construction, installation, or modification of the treatment equipment or system;

(b) The time needed to put into operation a new treatment facility to replace an existing system~~, this~~ that is not in compliance;

(c) Economic feasibility of compliance.

…

(12) Before a schedule proposed by the Department pursuant to 310 CMR 22.14(11) may take effect the Department shall provide notice and opportunity for a public hearing on the schedule.

…

(c) The Department shall give notice in the manner set forth in 310 CMR 22.14(12)(b) of any hearing to be held pursuant to a request submitted by an interested person or on his own motion. Notice of the hearing shall also be sent to the person requesting the hearing, ~~in~~ if any~~.~~ Notice of the hearing shall include a statement of the purpose of the hearing, information regarding the time and location of the hearing, and the address and telephone number of an office at which interested persons may obtain further information concerning the hearing. All hearing locations specified in the public notice shall be within the state. Notice of the hearing shall be given not less than 15 days prior to the time scheduled for the hearing.

…

(22) No exemptions from the maximum contaminant level for ~~total coliforms~~*E. coli* in 310 CMR 22.05(8) are allowed.

…

(27) Public water systems that use point-of-use or point-of-entry devices as a condition for obtaining a variance or an~~d~~ exemption from 310 CMR 22.00 must meet the following requirements:

(a) It is the responsibility of the public water system to operate and maintain the point-of-use and/or point-of-entry treatment system.

(b) Before point-of-use or point-of-entry devices are installed, the public water system must obtain the approval of monitoring plan which ensures that the devices provide~~d~~ health protection equivalent to ~~the~~ that provided by central water treatment.

(c) The public water system must apply effective technology under ~~the~~ a Department ~~-~~approved plan. The microbiological safety of the water must be maintained at all times.

(d) The Department will require adequate certification of performance, fie~~l~~ed testing, and, if not included in the certification process, a rigorous engineering design review of the point-of-use and/or point-of-entry devices.

(e) The design and application of the point-of-use and/or point-of-entry devices must consider the potential for increasing concentrations of heterotrophic bacteria in water treated with activated carbon. It may be necessary to use frequent backwashing, post-cont~~r~~actor disinfection, and Heterotrophic Pla~~n~~te Count monitoring to ensure that the microbiological safety of the water is not compromised.

(f) The public water system must assure the Department that buildings connected to the system will have sufficient ~~P~~point-of-use or point-of-entry devices that are properly installed, maintained, and monitored such that all consumers will be protected.

(g) In requiring the use of a point of entry device as a condition of granting an exemption fro~~r~~m the treatment requirement for lead and copper under 310 CMR 22.06B, the public water system~~supplier Department~~ must ~~be~~ assure~~d~~ the Department that use of the device will not cause increased corrosion of lead and copper bearing materials located between the device~~s~~ and the tap that could increase contaminant~~es~~ levels at the tap.

22.15: General Reporting Requirements

…

(5) Annual Statistical Report. Every Supplier of Water shall report electronically to the Department annually, by the due date specified each year on a form prescribed by the Department, full and complete information describing the operation of the Public Water System during the prior year, including but not limited to, the amount of water that passes through their Distribution Systems during the preceding calendar year. A Supplier of Water may request, on a form provided by the Department, approval for a hardship exemption from electronic reporting for the annual report due that year, based on a lack of internet access or service. If granted, the Supplier of Water shall make a paper filing for that year using a form provided by the Department. In no event shall the Supplier of Water fail to file the annual report by the due date specified above. Such reports shall include, at a minimum, the following:

…

(f) Names and Grades of Certified Operators.

(g) In accordance with 310 CMR 22.21(4)(b), for each well or wellfield under the Supplier of Water's ownership or control, a ~~A~~ report of new land uses within the following areas ~~Zones I, II, and III (where the Supplier of Water has obtained a Zone II waiver pursuant to 310 CMR 22.21(1)(f)) or within the Interim Wellhead Protection Area of each well and wellfield under the Supplier of Water's ownership or control that~~ could adversely impact water quality ~~in accordance with 310 CMR 22.21(4)(b):.~~

1. Zones I and II; or
2. Zones I and III where the Supplier of Water has obtained a Zone II waiver pursuant to 310 CMR 22.21(1)(f); or
3. Zone I and the Interim Wellhead Protection Area.

…

(9) Emergency Reporting.

(a) Except as otherwise determined by the Department in writing, each public water supplier shall notify the Department and its local Board of Health as soon as possible, but not more than two hours after obtaining knowledge of a potential or actual Emergency described in 310 CMR 22.15(9)(b)1., by calling the Department's Emergency notification telephone number or using any other electronic reporting tool designated by the Department, unless the water supplier establishes, by a preponderance of the evidence, that extenuating circumstances prevented notification within such two hour time period. Except as otherwise determined by the Department in writing, each public water supplier shall notify the Department and its local Board of Health as soon as possible but not more than 24 hours after obtaining knowledge of all other potential or actual Emergencies, including those described in 310 CMR 22.15(9)(b)2., by calling the Department's Emergency notification telephone number and using any other electronic reporting tool designated by the Department, unless the water supplier establishes, by a preponderance of the evidence, that extenuating circumstances prevented notification within such 24 hour time period. In the event of such extenuating circumstances, notification to the Department shall be made as soon as possible thereafter, taking into account the extenuating circumstances. Extenuating circumstances shall include, without limitation, the following:

1. A lack of reasonably available communication equipment at the site of the Emergency;
~~1.~~2. A need to take action prior to notification in order to mitigate or prevent an actual or potential threat to public health or safety; and/or
~~2.~~3. A physical injury to the Person responsible for notifying caused by or associated with the Emergency when the injury reasonably prevents that Person from notifying.

(b) Emergency reporting is required after the occurrence of any of the following incidents or Emergencies that result in the consumers of the system receiving water that does not meet required or routine quantity or quality conditions:

1. Emergencies or incidents requiring notification within two hours:

…

c. Chemical or microbiological contamination of the water supply in exceedance of limits specified by the Department's Office of Research and Standards (ORS), as set forth in ORS' Immediate Action Levels for Water Treatment Plant Chemicals (available on the Department's website ~~line at: http://www.mass.gov/eea/agencies/massdep/water/regulations/immediate-action-l evels-water-treatment-plant-chemicals.html~~);

d. Discovery of malicious intent or an act of vandalism, including without limitation cyberattack, which may impact a system component;

…

22.16: Public Notification Requirements

(1) (a) Public Water Systems Required to Notify. Each Supplier of Water for a Public Water System (Community Water Systems, Non-transient Non-community Water Systems, and Transient Non-community Water Systems) shall give notice for all violations of National Primary Drinking Water Regulations (NPDWR), 310 CMR 22.00 and for other situations, as listed in 310 CMR 22.16: *Table 1* or specified by the Department in writing. The term "violations" is used in 310 CMR 22.16 to include violations of the Maximum Contaminant Level (MCL), maximum residual Disinfection level (MRDL), Treatment Technique (TT), monitoring requirements, and testing procedures defined in 310 CMR 22.00 or specified by the Department in writing. 310 CMR 22.16: *Table 2* identifies the tier assignment for each specific violation or situation requiring a public notice.

310 CMR 22.16: *Table 1*
Violation Categories and other Situations Requiring a Public Notice

1. Violations.
   a. Failure to comply with an applicable Maximum Contaminant Level (MCL) or Maximum Residual Disinfectant Level (MRDL).
   b. Failure to comply with a prescribed Treatment Technique (TT).
   c. Failure to perform water quality monitoring, as required by 310 CMR 22.00.
   d. Failure to comply with testing procedures as prescribed by 310 CMR 22.00.
2. Variance and Exemptions under 310 CMR 22.13, 22.13A and 22.14.
   a. Operation under a variance or an exemption.
   b. Failure to comply with the requirements of any schedule that has been set under a variance or an exemption.

3. Special Public Notices.
   a. Occurrence of a Waterborne Disease Outbreak or other waterborne Emergencies or water supply Emergencies, including those described in 310 CMR 22.04(13).
   b. Exceedance of the nitrate MCL by Non-community Water Systems (NCWS), where granted permission by the Department under 310 CMR 22.13 and 22.13A.
   c. Exceedance of the Secondary Maximum Contaminant Level (SMCL) for fluoride.
   d. Availability of unregulated contaminant monitoring data.
   e. Other violations and situations determined by the Department to require a public notice under 310 CMR 22.16~~(1)(a)3.~~, not already listed in 310 CMR 22.16: *Table* ~~*1*~~*6*.

…

(2) Tier 1 Public Notice.

(a) Violations or Situations Requiring Tier 1 Public Notice. 310 CMR 22.16: *Table 3* lists the violation categories and other situations requiring a Tier 1 Public Notice. 310 CMR 22.16: *Table 6* identifies the tier assignment for each specific violation or situation.

310 CMR 22.16: *Table 3*
Violation Categories and Other Situations Requiring a Tier 1 Public Notice

~~1.~~ Violation of the MCL for~~when~~ *E. coli*~~, are present in the water Distribution System~~ ~~(~~as specified in 310 CMR 22.05(8)(a)~~), or when the water system fails to test for *E. coli*~~
1. ~~when any repeat sample tests positive for coliform (as specified in 310 CMR 22.05)~~;
2. Violation of the MCL for nitrate, nitrite, total nitrate and nitrite or perchlorate, as defined in 310 CMR 22.06, or when the water system fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate, nitrite or perchlorate MCL, as specified in 310 CMR 22.06(10);

…

(c) Form and Manner of Public Notice. Each Supplier of Water shall provide the notice within 24 hours in a form and manner reasonably calculated to reach all Persons served unless it is an Emergency situation identified in 310 CMR 22.04(13). For Emergencies identified in 310 CMR 22.04(13), each Supplier of Water shall provide the notice within the time frame specified in 310 CMR 22.16(b)(4) in a form and manner reasonably calculated to reach all Persons served. The form and manner used by the supplier are to fit the specific situation, but shall be designed to reach residential, transient, and non-transient users of the water system and meet the minimum information and format requirements specified by the Department.

…

3. In addition to the forms of delivery described in 310 CMR 22.16(2)(c)1., in order to accommodate modern methods of communication, each Supplier of Water shall also use one or more of the following forms of delivery, as approved by the Department, such approval to be based upon whether the proposed method is a customary method of communication for the Supplier of Water to reach its consumers, whether it is generally used by similar Suppliers of Water to reach their consumers, and/or the anticipated reach of the proposed method, unless the Department determines all such methods to be impractical:
   a. Telephone mass notification service;
   b. E-mail;
   c. Electronic messaging (*e.g.*, text messages, SMS);
   d. Social media;
   e. Website posting; or
   f. Any other electronic delivery method approved by the Department.

(3) Tier 2 Public Notice.

…

(b) Timeframe Required for Tier 2 Notification.

…

2. a. Each Supplier of Water shall repeat the notice every three months as long as the violation or situation persists, unless the Department determines in writing that appropriate circumstances warrant a different repeat notice frequency.
   b. In no circumstance may the repeat notice be given less frequently than once per year.
   c. In no circumstance may the frequency of a repeat notice for an MCL or Treatment Technique violation under 310 CMR 22.05, the Revised Total Coliform Rule; an MCL violation under 310 CMR 22.07G Per- and Polyfluoroalkyl Substances (PFAS); a Treatment Technique violation under 310 CMR 22.20A, the Surface Water Treatment Rule; 310 CMR 22.20D, the Interim Enhanced Surface Water Treatment Rule; 310 CMR 22.20F, the Long Term 1 Enhanced Surface Water Treatment Rule; or 310 CMR 22.20G, the Long Term 2 Enhanced Surface Water Treatment Rule; be reduced.

…

(5) Public Notice Content.

…

(c) Public Notice Presentation.

1. Each public notice required by 310 CMR 22.16(5):

a. Shall be displayed in a conspicuous way when printed or posted;
b. Shall not contain overly technical language or very small print;
c. Shall not be formatted in a way that defeats the purpose of the notice;
d. Shall not contain language which nullifies the purpose of the notice.

~~2.~~ Multilingual Requirements.

~~3.~~2. For~~In~~ any Public Water System~~community~~ where such~~a~~ Supplier of Water's consumers reside in any census tract with~~include~~ a minimum of either 5% or 1000 ~~non-English speaking~~ residents who lack English ~~speak a common~~ language proficiency~~For a Supplier of Water serving a large proportion of non-English speaking consumers, as determined in 310 CMR 22.16A~~, the public notice shall contain information in the ~~appropriate~~ language(s) appropriate for each such group of residents regarding the importance of the notice and that it should be translated. If the service area of a Public Water System~~such community~~ includes some or all of any census tract with a minimum of 25% of~~non-English speaking~~ residents who lack English~~speak a common~~ language proficiency, then the public notice shall also ~~or~~ contain a statement in the appropriate language(s) for each such group of residents which includes a telephone number or address where ~~Persons served~~those residents may contact the ~~water system~~affected Public Water System to obtain a translated copy of the public notice or ~~to request~~ assistance in the appropriate language(s).

~~a. In cases where the Department has not determined what constitutes a large proportion of non-English speaking consumers, the Supplier of Water shall include in the public notice the same information as in 310 CMR 22.16(5)(c)2.a., where appropriate to reach a large proportion of non-English speaking Persons served by the water system.~~

…

(10) Notice by Department ~~i~~on Behalf of the Supplier of Water.

…

310 CMR 22.16 - Table 6
Violations and Other Situations Requiring Public Notice[1]

Contaminant	MCL/MRDL/TT violations[2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
I. **Violations of National Primary Drinking Water Regulations and 310 CMR 22.00[3]**				
~~l. Per- and Polyfluoroalkyl Substances (PFAS)~~				
~~1. PFAS6~~	~~2~~	~~310 CMR 22.07G~~	~~3~~	~~310 CMR 22.07G~~
A. **Microbiological Contaminants**				
1.a. Total coliform (TT violations resulting from failure to perform assessments or corrective actions, monitoring violations, and reporting violations).	2	310 CMR 22.05(11)(b)1.	3	310 CMR 22.05(11)(c)1. 310 CMR 22.05(11)(d)1.
1.b. Seasonal System failure to follow Department-approved start-up plan prior to serving water to the public or failure to provide certification to the State.	2	310 CMR 22.05(11)(b)(2)	3	310 CMR 22.05(11)(d)3.
2.a. *E. coli* (MCL, monitoring, and reporting violations).	1	310 CMR 22.05(11)(a)	3[4]	310 CMR 22.05(11)(c)2. 310 CMR 22.05(11)(d)1. 310 CMR 22.05(11)(d)2.
2.b. *E. coli* (TT violations resulting from failure to perform Level 2 Assessments or corrective action).	2	310 CMR 22.05(11)(b)1.	……	……
3. Turbidity MCL.	2	310 CMR 22.08 310 CMR 22.20A 310 CMR 22.20D	3	310 CMR 22.08 310 CMR 22.20A 310 CMR 22.20D
4. Turbidity MCL (average of 2 days' samples > five NTU).	2[5], 1	310 CMR 22.08 310 CMR 22.20A	3	310 CMR 22.08 310 CMR 22.20A
5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable Turbidity level).	2[6], 1	310 CMR 22.08 310 CMR 22.20A 310 CMR 22.20D 310 CMR 22.20F	3	310 CMR 22.08 310 CMR 22.20A 310CMR 22.20D 310 CMR 22.20F

6. Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. allowable Turbidity level (TT).	2	310 CMR 22.20A	3	310 CMR 22.20A
7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. Turbidity level (TT).	2	310 CMR 22.20D[7]	3	310 CMR 22.20D
8. Filter Backwash Recycling Rule.	2	310 CMR 22.20E(3)	3	310 CMR 22.20E(2) and (4)
9. Long Term 1 Enhanced Surface Water Treatment Rule.	2	310 CMR 22.20F	3	310 CMR 22.20F
10. Long Term 2 Enhanced Surface Water Treatment Rule violations.	2	310 CMR 22.20G(11) through (23)	2[21], 3	310 CMR 22.20G(2) through (6), (9) and (10)
11. Ground Water Rule violations.	2	310 CMR 22.26(5)	3	310 CMR 22.26(3)(h) 310 CMR 22.26(4)(d)
Contaminant	MCL/MRDL/TT violations[2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
B. **Inorganic Chemicals (IOCs)**				
1. Antimony	2	310 CMR 22.06	3	310 CMR 22.06
2. Arsenic	2	310 CMR 22.06[8]	3	310 CMR 22.06[9]
3. Asbestos (fibers > 10 um)	2	310 CMR 22.06	3	310 CMR 22.06
4. Barium	2	310 CMR 22.06	3	310 CMR 22.06
5. Beryllium	2	310 CMR 22.06	3	310 CMR 22.06
6. Cadmium	2	310 CMR 22.06	3	310 CMR 22.06
7. Chromium (total)	2	310 CMR 22.06	3	310 CMR 22.06
8. Cyanide	2	310 CMR 22.06	3	310 CMR 22.06
9. Fluoride	2	310 CMR 22.06	3	310 CMR 22.06
10. Mercury (inorganic)	2	310 CMR 22.06	3	310 CMR 22.06
11. Nitrate	1	310 CMR 22.06	3	310 CMR 22.06
12. Nitrite	1	310 CMR 22.06	3	310 CMR 22.06
13. Total Nitrate and Nitrite	1	310 CMR 22.06	3	310 CMR 22.06
14. Perchlorate	1	310 CMR 22.06	3	310 CMR 22.06
15. Selenium	2	310 CMR 22.06	3	310 CMR 22.06
16. Thallium	2	310 CMR 22.06	3	310 CMR 22.06
C. **Lead and Copper Rule (Action Level for lead is 0.015 mg/L, for copper is 1.3 mg/L)**				
1. Lead and Copper Rule (TT)	2	310 CMR 22.06B	3	310 CMR 22.06B
D. **Synthetic Organic Chemicals (SOCs)**				
1. 2,4-D	2	310 CMR 22.07A	3	310 CMR 22.07A
2. 2,4,5-TP (Silvex)	2	310 CMR 22.07A	3	310 CMR 22.07A
3. Alachlor	2	310 CMR 22.07A	3	310 CMR 22.07A
4. Atrazine	2	310 CMR 22.07A	3	310 CMR 22.07A
5. Benzo(a)pyrene (PAHs)	2	310 CMR 22.07A	3	310 CMR 22.07A
6. Carbofuran	2	310 CMR 22.07A	3	310 CMR 22.07A
7. Chlordane	2	310 CMR 22.07A	3	310 CMR 22.07A
8. Dalapon	2	310 CMR 22.07A	3	310 CMR 22.07A
9. Di-(2-ethylhexyl) adipate	2	310 CMR 22.07A	3	310 CMR 22.07A
10. Di-(2-ethylhexyl) phthalate	2	310 CMR 22.07A	3	310 CMR 22.07A
11. Dibromochloropropane	2	310 CMR 22.07A	3	310 CMR 22.07A
12. Dinoseb	2	310 CMR 22.07A	3	310 CMR 22.07A
13. Dioxin (2,3,7,8-TCDD)	2	310 CMR 22.07A	3	310 CMR 22.07A
14. Diquat	2	310 CMR 22.07A	3	310 CMR 22.07A
15. Endothall	2	310 CMR 22.07A	3	310 CMR 22.07A
16. Endrin	2	310 CMR 22.07A	3	310 CMR 22.07A
17. Ethylene dibromide	2	310 CMR 22.07A	3	310 CMR 22.07A
18. Glyphosate	2	310 CMR 22.07A	3	310 CMR 22.07A
19. Heptachlor	2	310 CMR 22.07A	3	310 CMR 22.07A
20. Heptachlor epoxide	2	310 CMR 22.07A	3	310 CMR 22.07A

21. Hexachlorobenzene	2	310 CMR 22.07A	3	310 CMR 22.07A
22. Hexachlorocyclopentadiene	2	310 CMR 22.07A	3	310 CMR 22.07A
23. Lindane	2	310 CMR 22.07A	3	310 CMR 22.07A
24. Methoxychlor	2	310 CMR 22.07A	3	310 CMR 22.07A
25. Oxamyl (Vydate)	2	310 CMR 22.07A	3	310 CMR 22.07A
Contaminant	MCL/MRDL/TT violations [2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
26. Pentachlorophenol	2	310 CMR 22.07A	3	310 CMR 22.07A
27. Picloram	2	310 CMR 22.07A	3	310 CMR 22.07A
28. Polychlorinated biphenyls (PCBs)	2	310 CMR 22.07A	3	310 CMR 22.07A
29. Simazine	2	310 CMR 22.07A	3	310 CMR 22.07A
30. Toxaphene	2	310 CMR 22.07A	3	310 CMR 22.07A
E. **Volatile Organic Chemicals (VOCs)**				
1. Benzene	2	310 CMR 22.07B	3	310 CMR 22.07B
2. Carbon tetrachloride	2	310 CMR 22.07B	3	310 CMR 22.07B
3. Chlorobenzene (monochlorobenzene)	2	310 CMR 22.07B	3	310 CMR 22.07B
4. o-Dichlorobenzene	2	310 CMR 22.07B	3	310 CMR 22.07B
5. p-Dichlorobenzene	2	310 CMR 22.07B	3	310 CMR 22.07B
6. 1,2-Dichloroethane	2	310 CMR 22.07B	3	310 CMR 22.07B
7. 1,1-Dichloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B
8. cis-1,2-Dichloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B
9. trans-1,2-Dichloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B
10. Dichloromethane	2	310 CMR 22.07B	3	310 CMR 22.07B
11. 1,2-Dichloropropane	2	310 CMR 22.07B	3	310 CMR 22.07B
12. Ethylbenzene	2	310 CMR 22.07B	3	310 CMR 22.07B
13. Styrene	2	310 CMR 22.07B	3	310 CMR 22.07B
14. Tetrachloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B
15. Toluene	2	310 CMR 22.07B	3	310 CMR 22.07B
16. 1,2,4-Trichlorobenzene	2	310 CMR 22.07B	3	310 CMR 22.07B
17. 1,1,1-Trichloroethane	2	310 CMR 22.07B	3	310 CMR 22.07B
18. 1,1,2-Trichloroethane	2	310 CMR 22.07B	3	310 CMR 22.07B
19. Trichloroethylene	2	310 CMR 22.07B	3	310 CMR 22.07B
20. Vinyl chloride	2	310 CMR 22.07B	3	310 CMR 22.07B
21. Xylenes (total)	2	310 CMR 22.07B	3	310 CMR 22.07B
F. **Radioactive Contaminants**				
1. Beta/photon emitters	2	310 CMR 22.09A	3	310 CMR 22.09A
2. Alpha emitters	2	310 CMR 22.09A	3	310 CMR 22.09A
3. Combined radium (226 & 228)	2	310 CMR 22.09A	3	310 CMR 22.09A
4. Uranium[11, 12]	2	310 CMR 22.09A	3	310 CMR 22.09A
G. **Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfectant Residuals. Where Disinfection used in the treatment of drinking water, Disinfectants combine with organic and inorganic matter present in water to form chemicals called Disinfection byproducts (DBPs). EPA sets standards for controlling the levels of Disinfectants and DBPs in drinking water, including Trihalomethanes (THM s) and haloacetic acid (HAAs).**[13]				
1. Total Trihalomethanes (TTHMs)	2	310 CMR 22.07E	3	310 CMR 22.07E
2. Haloacetic Acids (HAA5)	2	310 CMR 22.07E	3	310 CMR 22.07E
3. Bromate	2	310 CMR 22.07E	3	310 CMR 22.07E
4. Chlorite	2	310 CMR 22.07E	3	310 CMR 22.07E
5. Chlorine (MRDL)	2	310 CMR 22.07E	3	310 CMR 22.07E
6. Chloramines (MRDL)	2	310 CMR 22.07E	3	310 CMR 22.07E
7. Chlorine dioxide (MRDL) where any two consecutive daily samples at entrance to Distribution System only are above MRDL	2	310 CMR 22.07E	2[14], 3	310 CMR 22.07E
Contaminant	MCL/MRDL/TT violations [2]		Monitoring & testing procedure violations	

	Tier of public notice required	Citation	Tier of public notice required	Citation
8. Chlorine dioxide (MRDL), where sample(s) in Distribution System the next day are also above MRDL	2[15]	310 CMR 22.07E	1	310 CMR 22.07E
9. Control of DBP precursors TOC (TT)	2	310 CMR 22.07E	3	310 CMR 22.07E
10. Bench marking and Disinfection profiling	N/A	N/A	3	310 CMR 22.07F
11. Development of monitoring plan	N/A	N/A	3	310 CMR 22.07E
H. **Other Treatment Techniques**				
1. Acrylamide (TT)	2	310 CMR 22.04(10)	N/A	310 CMR 22.04(10)
2. Epichlorohydrin (TT)	2	310 CMR 22.04(10)	N/A	310 CMR 22.04(10)
Per- and Polyfluoroalkyl Substances (PFAS)				
1. PFAS6	2	310 CMR 22.07G	3	310 CMR 22.07G
II. **Unregulated Contaminant Monitoring**: [16]				
A. Unregulated contaminants	N/A	N/A	3	310 CMR 22.07C
B. Nickel	N/A	N/A	3	310 CMR 22.06
III. **Public Notification for Variances and Exemptions**:				
A. Operation under a variance or exemption	3	310 CMR 22.13[17] 310 CMR 22.14	N/A	N/A
B. Violation of conditions of a variance or exemption	2	310 CMR 22.13[18] 310 CMR 22.14	N/A	N/A
IV. **Other Situations Requiring Public Notification**:				
A. Fluoride Secondary Maximum Contaminant level (SMCL) exceedance	3	310 CMR 22.06C	N/A	N/A
B. Exceedance of nitrate MCL for non-community systems, as allowed by the Department.	1	310 CMR 22.13 310 CMR 22.13A	N/A	N/A
C. Availability of unregulated contaminant monitoring data	3	310 CMR 22.07C	N/A	N/A
D. Waterborne Disease Outbreak	1	N/A	N/A	N/A
E. Other waterborne or water supply emergency[19].	1	N/A	N/A	N/A
F. Other situations as determined by the Department	1[20], 2, 3	N/A	N/A	N/A
G. Sodium	N/A	N/A	3	310 CMR 22.06A
H. Source water sample positive for Ground Water Rule fecal indicators: *E.coli, enterococci*, or colliphage	1	310 CMR 22.26(3)(g)	N/A	N/A
I. Change or failure of Treatment Technique or practice (TT)	2	310 CMR 22.04(4)	N/A	310 CMR 22.04(4)
J. Ground Water Rule Significant Deficiency or source water fecal contamination	3	310 CMR 22.16(13)	N/A	N/A

Commented [A1]: This is the letter "I" and follows section H., just above. It is not the roman numeral "I" preceding the roman numeral "II" which follows.

Table 6 - Endnotes

1. Violations and other situations not listed in this table (*e.g.* failure to prepare Consumer Confidence Reports), do not require notice, unless otherwise determined by the Department. The Department may, at its option, also require a more stringent public notice tier (*e.g.*, Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Table, as authorized under 310 CMR 22.16(2)(a) and (3)(a).
2. MCL-Maximum contaminant level, MRDL-Maximum Residual Disinfectant Level, TT-Treatment Technique.
3. The term Violations of 310 CMR 22.00 is used here to include violations of MCL, MRDL, Treatment Technique, monitoring, and testing procedure requirements.
4. Failure to test for ~~fecal coliform or~~ *E. coli* is a Tier 1 violation if testing is not done after any repeat sample tests positive for coliform. All other total coliform monitoring and testing procedure violations are Tier 3.
5. Systems that violate the Turbidity MCL of five NTU based on an average of measurements over two consecutive days shall consult with the Department within 24 hours after learning of the violation. Based on this consultation, the Department may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the Department in the 24-hour period, the violation is automatically elevated to Tier 1.
6. Systems with Treatment Technique violations involving a single exceedance of a maximum Turbidity limit under 310 CMR 22.20A, the Surface Water Treatment Rule (SWTR), 310 CMR 22.20D, the Interim Enhanced Surface Water Treatment Rule (IESWTR), or 310 CMR 22.20F, the Long Term 1 Enhanced Surface Water Treatment Rule, are required to consult with the Department within 24 hours after learning of the violation. Based on this consultation, the Department may subsequently

decide to elevate the violation to Tier 1. If a system is unable to make contact with the Department in the 24-hour period, the violation is automatically elevated to Tier 1.

7. Most of the requirements of the Interim Enhanced Surface Water Treatment Rule 310 CMR 22.20D become effective January 1, 2002 for Surface Water Sources systems (surface water systems and groundwater systems under the direct influence of surface water) serving at least 10,000 persons. However, 310 CMR 22.20D has some requirements that become effective as early as April 16, 1999. The Surface Water Treatment Rule, 310 CMR 22.20A, remains in effect for some systems serving at least 10,000 persons even after 2002; the Interim Enhanced Surface Water Treatment Rule, 310 CMR 22.20D, adds additional requirements and does not in many cases supersede the SWTR.
8. The arsenic MCL citations are effective January 23, 2006.
9. The arsenic Tier 3 violation citations are effective January 23, 2006.
10. Failure to take a confirmation sample within 24 hours for nitrate, nitrite or perchlorate after an initial sample exceeds the MCL is a Tier 1 violation. Other monitoring violations for nitrate, nitrite or perchlorate are Tier 3.
11. The uranium MCL Tier 2 violation citations are effective December 8, 2003 for all Community Water Systems.
12. The uranium MCL Tier 3 violation citations are effective December 8, 2003 for all Community Water Systems.
13. Community and non-transient non-community Surface Water Sources systems (surface water systems and groundwater systems under the direct influence of surface water) serving at least 10,000 persons shall comply with the new DBP MCLs, Disinfectant MRDLs, and related monitoring requirements beginning January 1, 2002. All other Community and Non-transient Non-community Water Systems shall meet the MCLs and MRDLs beginning January 1, 2004. Transient non-community Surface Water Sources systems (surface water systems and groundwater systems under the direct influence of surface water) serving at least 10,000 persons using chlorine dioxide as a Disinfectant or oxidant shall comply with the chlorine dioxide MRDL beginning January 1, 2002. Transient non-community Surface Water Sources systems (surface water systems and groundwater systems under the direct influence of surface water) serving at least 10,000 persons and Transient Non-community Water Systems serving fewer than 10,000 persons and Transient Non-community Water Systems using only groundwater not under the direct influence of surface water and using chlorine dioxide as a Disinfectant or oxidant shall comply with the chlorine dioxide MRDL beginning January 1, 2004.
14. Failure to monitor for chlorine dioxide at the entrance to the Distribution System the day after exceeding the MRDL at the entrance to the Distribution System is a Tier 2 violation.
15. If any daily sample taken at the entrance to the Distribution System exceeds the MRDL for chlorine dioxide and one or more samples taken in the Distribution System the next day exceed the MRDL, Tier 1 notification is required. Failure to take the required samples in the Distribution System after the MRDL is exceeded at the entry point also triggers Tier 1 notification.
16. Some water systems shall monitor for certain unregulated contaminants listed in 310 CMR 22.07C.
17. This citation refers to 310 CMR 22.13 and 22.14 and requires that "a schedule prescribed for a Public Water System granted a variance [or exemption] shall require compliance by the system".
18. In addition, 310 CMR 22.13A specifies the items and schedule milestones that shall be included in a variance for small systems.
19. Other waterborne Emergencies require a Tier 1 Public Notice under 310 CMR 22.16 (2)(a)7. for situations that do not meet the definition of a Waterborne Disease Outbreak given in 310 CMR 22.02(1) but that still have the potential to have serious adverse effects on health as a result of short-term exposure. These could include outbreaks not related to treatment deficiencies, as well as situations that have the potential to cause outbreaks, such as failures or significant interruption in water treatment processes, natural disasters that disrupt the water supply or Distribution System, chemical spills, or unexpected loading of possible pathogens into the source water.
20. The Department may place other situations in any tier they believe appropriate, based on threat to public health.
21. Failure to collect three or more samples for *Cryptosporidium* analysis is a Tier 2 violation requiring special notice as specified in 310 CMR 22.16(12). All other monitoring and testing procedure violations are Tier 3.

310 CMR 22.16: *Table 7*
Standard Health Effects Language for Public Notification

Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
A. Microbiological Contaminants:			
1a. Coliform Assessment and/or Corrective Action Violations	N/A	TT	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system. We found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessments to identify problems and to correct any problems that are found. [THE SYSTEM MUST USE 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).

1b. *E. coli*	Zero	MCL violation if any of the following: (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.	*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.
1c. Fecal indicators (GWR)			Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term, health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
i. *E.coli*	Zero	TT	
ii. enterococci	None	TT	
iii. coliphage	None	TT	
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
1d. Ground Water Rule (GWR) TT violations	None	TT	Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.
1e. *E. coli* Assessment and/or Corrective Action Violations	N/A	TT	*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 USE 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 that we conducted.
1f. Seasonal System TT Violations	N/A	TT	When this violation includes the failure to monitor for total coliforms or *E. coli* prior to serving water to the public, the mandatory language found at 310 CM R 22.16(5)(d)2. must be used. When this violation includes failure to complete other actions, the appropriate elements found in 310 CMR 22.16(5)(a) to describe the violation must be used.
2a. Turbidity (MCL)[4]	None	one NTU[5] five NTU	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for

			microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, Viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
2b. Turbidity (SWTR TT)[6]	None	TT[7]	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, Viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
2c. Turbidity (IESWTR TT) and LT1ESWTR TT)[8]	None	TT	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, Viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDW R) and Massachusetts Drinking Water Regulations:			
B. Surface Water Treatment Rule (SW TR), Interim Enhanced Surface Water Treatment Rule (IESWTR), Filter Backwash Recycling Rule (FBRR) and Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) violations:			
3. *Giardia lamblia* (SWTR/IESWTR/LT1ESWTR)	Zero	TT[10]	Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, Viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
4. Viruses (SWTR/IESWTR/LT1ESWTR)			
5. Heterotrophic plate count (HPC) bacteria[9] (SWTR/IESWTR/LT1ESWTR)			
6. Legionella (SWTR/IESWTR/LT1ESWTR)			
7. Cryptosporidium (IESWTR/LT1ESWTR/FBRR)			
C. Inorganics			
8. Antimony	0.0~~1~~06	0.006	Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
9. Arsenic[11]	~~None~~0	0.0~~5~~10	Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.
10. Asbestos (fibers > 10 µm)	7 MFL[12]	7 MFL	Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.
11. Barium	2	2	Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
12. Beryllium	0.004	0.004	Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.
13. Cadmium	0.0~~1~~05	0.005	Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.
14. Chromium (total).	0.1	0.1	Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.

15. Cyanide	0.2	0.2	Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.
16. Fluoride	4.0	4.0	Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Fluoride in drinking water at half the MCL or more may cause mottling of children's teeth, usually in children younger than nine years old. Mottling, also known as dental fluorosis, may include brown staining and/or pitting of the teeth, and occurs only in developing teeth before they erupt from the gums.
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
17. Mercury (inorganic)	0.002	0.002	Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.
18. Nitrate	10	10	Infants younger than six months old who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
19. Nitrite	1	1	Infants younger than six months old who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
20. Total Nitrate and Nitrite	10	10	Infants younger than six months old who drink water containing nitrate and nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
21. Perchlorate	None	0.002	Perchlorate interferes with the normal function of the thyroid gland and thus has the potential to affect growth and development and could cause brain damage and other adverse effects, particularly in fetuses and infants.
22. Selenium	0.05	0.05	Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.
23. Thallium	0.0005	0.002	Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.
D. Lead and Copper Rule:			
24. Lead	Zero	TT[13]	Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.
25. Copper	1.3	TT[14]	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.
E. Synthetic Organic Chemicals (SOCs):			
26. 2,4-D	0.07	0.07	Some people who drink water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands.
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			

27. 2,4,5-TP (Silvex)	0.05	0.05	Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.
28. Alachlor	Zero	0.002	Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.
29. Atrazine	0.003	0.003	Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.
30. Benzo(a)pyrene (PAHs).	Zero	0.0002	Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
31. Carbofuran	0.04	0.04~~03~~	Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.
32. Chlordane	Zero	0.002	Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.
33. Dalapon	0.2	0.2	Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.
34. Di (2-ethylhexyl) adipate	0.4	0.4	Some people who drink water containing di (2-ethylhexyl) adipate well in excess of the MCL over many years could experience general toxic effects or reproductive difficulties.
35. Di (2-ethylhexyl) phthalate	Zero	0.006	Some people who drink water containing di (2-ethylhexyl) phthalate in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.
36. Dibromochloropropane (DBCP)	Zero	0.0002	Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
37. Dinoseb	0.04~~07~~	0.007	Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
38. Dioxin (2,3,7,8-TCDD)	Zero	$3x10^{-8}$	Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
39. Diquat	0.02	0.02	Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.
40. Endothall	0.1	0.1	Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
41. Endrin	0.002	0.002	Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.
42. Ethylene dibromide	Zero	0.00002	Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.
43. Glyphosate	0.7	0.7	Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.

44. Heptachlor	Zero	0.0004	Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.
45. Heptachlor epoxide	Zero	0.0002	Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.
46. Hexachlorobenzene	Zero	0.001	Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.
47. Hexachlorocyclopentadiene	0.05	0.05	Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.
48. Lindane	0.0002	0.0002	Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.
49. Methoxychlor	0.04	0.04	Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
50. Oxamyl (Vydate)	0.2	0.2	Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.
51. Pentachlorophenol	Zero	0.001	Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.
52. Picloram	0.5	0.5	Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.
53. Polychlorinated biphenyls (PCBs)	Zero	0.0005~~1~~	Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of cancer.
54. Simazine	0.004	0.004	Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.
55. Toxaphene	Zero	0.003	Some people who drink water containing toxaphene. in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
F. Volatile Organic Chemicals (VOCs):			
56. Benzene	Zero	0.005	Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of cancer.
57. Carbon tetrachloride	Zero	0.005	Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
58. Chlorobenzene (monochlorobenzene)	0.1	0.1	Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.
59. o-Dichlorobenzene	0.6	0.6	Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.

60. p-Dichlorobenzene	0.0054	0.005	Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.
61. 1,2-Dichloroethane	Zero	0.005	Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
62. 1,1-Dichloroethylene	0.0074	0.007	Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
63. cis-1,2- Dichloroethylene	0.07	0.07	Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
64. trans-1,2- Dichloroethylene	0.1	0.1	Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.
65. Dichloromethane	Zero	0.005	Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.
66. 1,2-Dichloropropane	Zero	0.005	Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
67. Ethylbenzene	0.7	0.7	Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
68. Styrene	0.1	0.1	Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
69. Tetrachloroethylene	Zero	0.005	Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.
70. Toluene	1	1	Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.
71. 1,2,4-Trichlorobenzene	0.07	0.07	Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.
72. 1,1,1-Trichloroethane	0.2	0.2	Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.
73. 1,1,2-Trichloroethane	0.003	0.005	Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.
74. Trichloroethylene	Zero	0.005	Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
75. Vinyl chloride	Zero	0.002	Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
76. Xylenes (total)	10	10	Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.
G. Radioactive Contaminants:			
77. Beta/photon emitters	Zero	4 mrem/yr[15]	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and

			photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
78. Alpha emitters	Zero	15 pCi/l[17]	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess the MCL over many years may have an increased risk of getting cancer.
79. Combined radium (226 & 228)	Zero	5 pCi/l	Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
80. Uranium	Zero	30 ~~mu~~g/l[16]	Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.
H. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfectant Residuals. Where Disinfection used in the treatment of drinking water, Disinfectants combine with organic and inorganic matter present in water to form chemicals called Disinfection byproducts (DBPs). EPA sets standards for controlling the levels of Disinfectants and DBPs in drinking water, including Trihalomethanes (THMs) and haloacetic acid (HAAs).[18]			
81. Total trihalomethanes (TTHMs)	N/A	0.080[19, 20]	Some people who drink water containing (TTHMs) Trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.
82. Haloacetic Acids (HAA)	N/A	0.060[21]	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
83. Bromate	Zero	0.010	Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.
84. Chlorite	0.08	1.0	Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia.
85. Chlorine	4 (MRDLG)[22]	4.0 (MRDL)[23]	Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.
86. Chloramines	4 (MRDLG)	4.0 (MRDL)	Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.
87a. Chlorine dioxide, where any two consecutive daily samples taken at the entrance to the Distribution System are above the MRDL.	0.8 (MRDLG)	0.8 (MRDL)	Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. *Add for public notification only:* The chlorine dioxide violations reported today are the result of exceedances at the treatment facility only, not within the distribution system which delivers water to consumers. Continued compliance with chlorine dioxide levels within the distribution system minimizes the potential risk of these violations to consumers.
87b. Chlorine dioxide, where one or more Distribution System samples are above the MRDL.	0.8 (MRDLG)	0.8 (MRDL)	Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. *Add for public notification only:* The chlorine dioxide

			violations reported today include exceedances of the EPA standard within the distribution system which delivers water to consumers. Violations of the chlorine dioxide standard within the distribution system may harm human health based on short-term exposures. Certain groups, including fetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure.
Contaminant	MCLG[1] mg/l	MCL[2] mg/l	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR) and Massachusetts Drinking Water Regulations:			
88. Control of DBP precursors (TOC)	None	TT	Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include Trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer.
I. Other Treatment Techniques:			
89. Acrylamide	Zero	TT	Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.
90. Epichlorohydrin	Zero	TT	Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.
J. Per- and Polyfluoroalkyl Substances (PFAS)			
91. PFAS6	None	20 ng/l[24]	Some people who drink water containing these PFAS in excess of the MCL may experience certain adverse effects. These could include effects on the liver, blood, immune system, thyroid, and fetal development. These PFAS may also elevate the risk of certain cancers.

…

22.16A: Consumer Confidence Reporting Requirements

…

(4) Content of the Reports. Each Community Water System must provide to its customers an annual report that contains the information specified in 310 CMR 22.16A(4).

…

(f) Information on Detected Contaminants. 310 CMR 22.16A(4)(f) through (m) specifies the requirements for information to be included in each report for contaminants subject to mandatory monitoring (except *Cryptosporidium*). It applies to:

1. Contaminants subject to an MCL, Action Level, Maximum Residual Disinfectant Level or Treatment Technique (regulated contaminants);
2. Unregulated ~~C~~contaminants for which monitoring is required by 40 CFR 141.40~~, or by the Department310 CMR 22.03(2)~~ or 310 CMR 22.07C, or pursuant to the Department's authority under 310 CMR 22.03(2) ~~(unregulated contaminants)~~; and
3. Disinfection by-products or microbial contaminants for which monitoring is required by 40 CFR 141.142 and 141.143, except as provided at 310 CMR 22.16A(5)(a), and which are detected in the finished water.

…

(i) For detected regulated contaminants listed in 310 CMR 22.00, including without limitation in 310 CMR 22.16A(27), the table(s) shall contain:

…

4. For contaminants subject to an MCL, except Turbidity and *E. coli*, the highest contaminant level used to determine compliance with 310 CMR 22.00 and the range of detected levels, as follows:

…

f. When compliance with the MCL is determined by calculating a quarterly average of all samples taken at a monitoring location: the quarterly average for each location that exceeded the MCL and the range of results from all Sampling Points expressed in the same units as the MCL.

…

(m) A report that contains information regarding a Level 1 or Level 2 Assessment required under 310 CMR 22.05 must include the applicable definitions for the purpose of 310 CMR 22.16A:

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

~~1.~~2. Level 2 Assessment: A Level 2 assessment is a very detailed study of the water system to identify potential problems and determine (if possible) why an *E. coli* MCL violation has occurred and/or why total coliform bacteria have been found in ~~the our~~our water system on multiple occasions.

…

(8) Additional Information.

...

(c) For~~In~~ any Public Water System~~communities community~~ where such~~a~~ Supplier of Water's consumers reside in any census tract with~~include~~ a minimum of either ~~with 10~~5% or ~~greater, or greater than~~ 1000 ~~people (whichever is lesser) of non-English speaking~~ residents who lack English~~speak a common~~ language proficiency, the report ~~must~~ shall contain information in the ~~appropriate~~ language(s) appropriate for each such group of residents regarding the importance of the report and that it should be translated. ~~In~~ If the service area of a Public Water System~~such communities community serving~~ includes some or all of any census tract with a minimum of 25% ~~or greater of~~ of~~non-English speaking~~ residents who lack Enlgish~~speak a common~~ language proficiency, then the report ~~must~~ shall also contain a statement in the appropriate language(s) for each such group of residents which includes a telephone number or address where ~~such~~ those residents may contact the ~~system~~ affected Public Water System to obtain a translated copy of the report or assistance in the appropriate language(s).

…

(12) Every report must include the following lead-specific information:

(a) A short informational statement about lead in drinking water and its effects 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 materials and components associated with service lines and home plumbing. [NAME OF UTILITY] 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 two 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 http://www~~water~~.epa.gov/safewater~~drink/info~~/lead~~/index.cfm~~.

…

(27) Charts for Regulated Contaminants, Unregulated Contaminants, and Secondary Contaminants.

(a) Table 1: Regulated Contaminants Chart

Key:

AL=Action Level	**MRDL**=Maximum Residual Disinfectant Level	**ppm**=parts per million, or milligrams per liter (mg/L)
CCR=Consumer Confidence Report	**MRDLG**=Maximum Residual Disinfectant Level Goal	**ppb**=parts per billion, or micrograms per liter (ug/L)
MCL=Maximum Contaminant Level	**mrem/year**=millirems per year (a measure of radiation absorbed by the body)	**ppt**=parts per trillion, or nanograms per liter
MCLG =Maximum Contaminant Level Goal	**NTU**=Nephelometric Turbidity Units	**ppq**=parts per quadrillion, or picograms per liter
MFL=Million Fibers per Liter	**pCi/L**=picocuries per liter (a measure of radioactivity)	**TT**=Treatment Technique

Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
Microbiological Contaminants						
1. *Cryptosporidium*	TT	-	TT	0	Discharged especially where water is contaminated with sewage or animal wastes.	Some people who drink water containing *Cryptosporidium* could experience severe gastrointestinal effects.
2. *Giardia lamblia*	TT	-	TT	0	Discharged especially where water is contaminated with sewage or animal wastes.	Some people who drink water containing *Giardia lamblia* could experience severe gastrointestinal effects.

3. *Heterotrophic* plate count	TT	-	TT	N/A	Heterotrophic plate count is an indicator method that measures a range of naturally-occurring bacteria in the environment.	Heterotrophic plate count is not associated with health effects but is a method that measures the bacterial quality of the water as an indicator of the adequacy of water treatment.
4. *Legionella*	TT	-	TT	0	Natural sources; multiplies in heating and air-conditioning systems.	Some people who use drinking water containing *Legionella* could experience Legionnaire's Disease, a type of pneumonia.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
5 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. 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.
6 *E. coli*	Routine and repeat samples are total coliform-positive and either is *E. coli*-positive or Supplier of Water fails to take repeat samples following *E. coli*-positive routine sample or Supplier of Water 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.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language

7 Fecal Indicators (*E. coli*, enterococci, or coliphage) Groundwater Rule	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.
8 Total organic carbon	TT	-	TT	N/A	Naturally present in the environment	Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection by products. These byproducts include Trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increase risk of getting cancer.
9 Turbidity	TT	-	TT	N/A	Soil runoff	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, Viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
10. Viruses (enteric)	TT	-	TT	0	Discharged especially where water is contaminated with sewage or animal wastes	Some people who drink water containing Viruses could experience severe gastrointestinal effects.
Radioactive Contaminants						

11. Beta/photon emitters	4 mrem/yr	-	4 mrem/yr	0	Decay of natural and man-made deposits	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
12. Alpha emitters	15 pCi/l	-	15 pCi/l	0	Erosion of natural deposits	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
13. Combined radium	5 pCi/l	-	5 pCi/l	0	Erosion of natural deposits	Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
14. Uranium	0.030 mg/l	1000	30 ppb[1]	0	Erosion of natural deposits	Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
Inorganic Contaminants						
15. Antimony	0.006 mg/l	1000	6 ppb	6 ppb	Fire retardants; ceramics; electronics; solder	Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
16. Arsenic	0.010 mg/l	1000	10 ppb	0~~N/A~~	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes	Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.
17. Asbestos	7 MFL	-	7 MFL	7 MFL	Decay of asbestos cement water mains; erosion of natural deposits	Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.

18. Barium	2 mg/l	-	2 ppm	2 ppm	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
19. Beryllium	0.004 mg/l	1000	4 ppb	4 ppb	Discharge from electrical, aerospace, and defense industries; erosion of natural deposits	Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.
20. Bromate	0.010 mg/l	1000	10 ppb	0	By-product of drinking water Disinfection	Some people who drink water containing bromate in excess of the MCL over many years have an increased risk of getting cancer.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
21. Cadmium	0.005 mg/l	1000	5 ppb	5 ppb	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.
22. Chloramines	MRDL = 4 mg/l	-	MRDL = 4 ppm	MRDLG = 4 ppm	Water additive used to control microbes	Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.
23. Chlorine	MRDL = 4 mg/l	-	MRDL = 4 ppm	MRDLG = 4 ppm	Water additive used to control microbes	Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.
24. Chlorine dioxide	MRDL = 0.8 mg/l	1000	800 ppb	MRDLG = 800 ppb	Water additive used to control microbes	Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.

25. Chlorite	1 mg/l	-	1 ppm	0.8 ppm	By-product of drinking water Disinfection	Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
26. Chromium	0.1 mg/l	1000	100 ppb	100 ppb	Discharge from steel and pulp mills; erosion of natural deposits	Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.
27. Copper	AL=1.3 mg/l	-	AL=1.3 ppm	1.3 ppm	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.
28. Cyanide	0.2 mg/l	1000	200 ppb	200 ppb	Discharge from metal factories; discharge from plastic and fertilizer factories	Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.
29. Fluoride[3]	4 mg/l	-	4 ppm	4 ppm	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories	Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Children may get mottled teeth.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
30. Lead	AL = 0.015 mg/l	1000	AL = 15 ppb	0	Corrosion of household plumbing systems; erosion of natural deposits	Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.

31. Mercury [inorganic]	0.002 mg/l	1000	2 ppb	2 ppb	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills; runoff from cropland	Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.
32. Nitrate	10 mg/l	-	10 ppm	10 ppm	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	Infants younger than six months old who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
33. Nitrite	1 mg/l	-	1 ppm	1 ppm	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	Infants younger than six months old who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
34. Perchlorate	0.002 mg/l	1000	2 ppb	N/A	Rocket propellants, fireworks, munitions, flares, blasting agents	Perchlorate interferes with the normal function of the thyroid gland and thus has the potential to affect growth and development, causing brain damage and other adverse effects, particularly in fetuses and infants. Pregnant women, the fetus, infants, children younger than 12 years old, and people with a hypothyroid condition are particularly susceptible to perchlorate toxicity.
35. Selenium	0.05 mg/l	1000	50 ppb	50 ppb	Discharge from metal refineries; erosion of natural deposits; discharge from mines	Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.
36. Thallium	0.002 mg/l	1000	2 ppb	0.5 ppb	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
Synthetic Organic Contaminants Including Pesticides and Herbicides						

37. 2,4-D	0.07 mg/l	1000	70 ppb	70 ppb	Runoff from herbicide used on row crops	Some people who drink water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands.
38. 2,4,5-TP [Silvex]	0.05 mg/l	1000	50 ppb	50 ppb	Residue of banned herbicide	Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.
39. Acrylamide	TT	-	TT	0	Added to water during sewage/ wastewater treatment	Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.
40. Alachlor	0.002 mg/l	1000	2 ppb	0	Runoff from herbicide used on row crops	Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.
41. Atrazine	0.003 mg/l	1000	3 ppb	3 ppb	Runoff from herbicide used on row crops	Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
42. Benzo(a)pyrene [PAH]	0.0002 mg/l	1,000,000	200 ppt	0	Leaching from linings of water storage tanks and distribution lines	Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
43. Carbofuran	0.04 mg/l	1000	40 ppb	40 ppb	Leaching of soil fumigant used on rice and alfalfa	Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.
44. Chlordane	0.002 mg/l	1000	2 ppb	0	Residue of banned termiticide	Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.

45. Dalapon	0.2 mg/l	1000	200 ppb	200 ppb	Runoff from herbicide used on rights of way	Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.
46. Di(2-ethylhexyl) adipate	0.4 mg/l	1000	400 ppb	400 ppb	Discharge from chemical factories	Some people who drink water containing di(2-ethylhexyl) adipate well in excess of the MCL over many years could experience toxic effects such as weight loss, liver enlargement, or possible reproductive difficulties.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
47. Di(2-ethylhexyl) phthalate	0.006 mg/l	1000	6 ppb	0	Discharge from rubber and chemical factories	Some people who drink water containing di(2-ethylhexyl) phthalate well in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.
48. Dibromochloropropane (DBCP)	0.0002 mg/l	1,000,000	200 ppt	0	Runoff/leaching from soil fumigant used on soybeans, cotton, and orchards	Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive problems and may have an increased risk of getting cancer.
49. Dinoseb	0.007 mg/l	1000	7 ppb	7 ppb	Runoff from herbicide used on soybeans and vegetables	Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
50. Diquat	0.02 mg/l	1000	20 ppb	20 ppb	Runoff from herbicide use	Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.
51. Dioxin [2,3,7,8-TCDD]	0.00000003 mg/l	1,000,000,000	30 ppq	0	Emissions from waste incineration and other combustion; discharge from chemical factories	Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
52. Endothall	0.1 mg/l	1000	100 ppb	100 ppb	Runoff from herbicide use	Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.

53. Endrin	0.002 mg/l	1000	2 ppb	2 ppb	Residue of banned insecticide	Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.
54. Epichlorohydrin	TT	-	TT	0	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.
55. Ethylene dibromide	0.00002 mg/l	1,000,000	20 ppt	0	Discharge from petroleum refineries	Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.
56. Glyphosate	0.7 mg/l	1000	700 ppb	700 ppb	Runoff from herbicide use	Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
57. Heptachlor	0.0004 mg/l	1,000,000	400 ppt	0	Residue of banned pesticide	Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.
58. Heptachlor epoxide	0.0002 mg/l	1,000,000	200 ppt	0	Breakdown of heptachlor	Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.
59. Hexachlorobenzene	0.001 mg/l	1000	1 ppb	0	Discharge from metal refineries and agricultural chemical factories	Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.
60. Hexachlorocyclopentadiene	0.05 mg/l	1000	50 ppb	50 ppb	Discharge from chemical factories	Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.
61. Lindane	0.0002 mg/l	1,000,000	200 ppt	200 ppt	Runoff/leaching from insecticide used on cattle, lumber, gardens	Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.

Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
62. Methoxychlor	0.04 mg/l	1000	40 ppb	40 ppb	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock	Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
63. Oxamyl [Vydate]	0.2 mg/l	1000	200 ppb	200 ppb	Runoff/leaching from insecticide used on apples, potatoes and tomatoes	Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.
64. PCBs [Polychlorinated biphenyls]	0.0005 mg/l	1,000,000	500 ppt	0	Runoff from landfills; discharge of waste chemicals	Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.
65. Pentachlorophenol	0.001 mg/l	1000	1 ppb	0	Discharge from wood preserving factories	Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.
66. Picloram	0.5 mg/l	1000	500 ppb	500 ppb	Herbicide runoff	Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.
67. Simazine	0.004 mg/l	1000	4 ppb	4 ppb	Herbicide runoff	Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.
68. Toxaphene	0.003 mg/l	1000	3 ppb	0	Runoff/leaching from insecticide used on cotton and cattle	Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
Volatile Organic Contaminants						

69. Benzene	0.005 mg/l	1000	5 ppb	0	Discharge from factories; leaching from gas storage tanks and landfills	Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.
70. Carbon tetrachloride	0.005 mg/l	1000	5 ppb	0	Discharge from chemical plants and other industrial activities	Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
71. Chlorobenzene	0.1 mg/l	1000	100 ppb	100 ppb	Discharge from chemical and agricultural chemical factories	Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.
72. o-Dichlorobenzene	0.6 mg/l	1000	600 ppb	600 ppb	Discharge from industrial chemical factories	Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.
73. p-Dichlorobenzene	0.005 mg/l	1000	5 ppb	5 ppb	Discharge from industrial chemical factories	Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.
74. 1,2-Dichloroethane	0.005 mg/l	1000	5 ppb	0	Discharge from industrial chemical factories	Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
75. 1,1-Dichloroethylene	0.007 mg/l	1000	7 ppb	7 ppb	Discharge from industrial chemical factories	Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.

76. cis-1,2-Dichloroethylene	0.07 mg/l	1000	70 ppb	70 ppb	Discharge from industrial chemical factories	Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
77. trans-1,2-Dichloroethylene	0.1 mg/l	1000	100 ppb	100 ppb	Discharge from industrial chemical factories	Some people who drink water containing trans-1,2-dichloroethylene well in exc•ess of the MCL over many years could experience problems with their liver.
78. Dichloromethane	0.005 mg/l	1000	5 ppb	0	Discharge from pharmaceutical and chemical factories	Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.
79. 1,2-Dichloropropane	0.005 mg/l	1000	5 ppb	0	Discharge from industrial chemical factories	Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
80. Ethylbenzene	0.7 mg/l	1000	700 ppb	700 ppb	Discharge from industrial chemical factories	Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
81. Haloacetic Acids (HAA5)	0.060 mg/l	1000	60 ppb	N/A	By-product of drinking water Disinfection	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
82. Styrene	0.1 mg/l	1000	100 ppb	100 ppb	Discharge from rubber and plastic factories; leaching from landfills	Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.
83. Tetrachloroethylene	0.005 mg/l	1000	5 ppb	0	Discharge from factories and dry cleaners and asbestos cement lined pipes	Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.

84. 1,2,4-Trichlorobenzene	0.07 mg/l	1000	70 ppb	70 ppb	Discharge from textile-finishing factories	Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.
85. 1,1,1-Trichloroethane	0.2 mg/l	1000	200 ppb	200 ppb	Discharge from metal degreasing sites and other factories	Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
86. 1,1,2-Trichloroethane	0.005 mg/l	1000	5 ppb	3 ppb	Discharge from industrial chemical factories	Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.
87. Trichloroethylene	0.005 mg/l	1000	5 ppb	0	Discharge from metal degreasing sites and other factories	Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
88. TTHMs [Total Trihalomethanes]	0.080 mg/l	1000	80 ppb	N/A	By-product of drinking water Disinfection	Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.
89. Toluene	1 mg/l	-	1 ppm	1 ppm	Discharge from petroleum factories	Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.
Contaminant	Traditional MCL	To convert for CCR, multiply by	MCL in CCR units	MCLG in CCR units	Major Sources in Drinking Water	Health Effects Language
90. Vinyl Chloride	0.002 mg/l	1000	2 ppb	0	Leaching from PVC piping; discharge from plastics factories	Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.

91. Xylenes	10 mg/l (10,000 ppb)	1000	10 ppm 10,000 ppb	10 ppm	Discharge from petroleum factories; discharge from chemical factories	Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.
Per- and Polyfluoroalkyl Substances (PFAS)						
92. PFAS6	0.000020 mg/l	1,000,000	20 ng/l (or ppt)	None	Discharges and emissions from industrial and manufacturing sources associated with the production or use of these PFAS, including production of moisture and oil resistant coatings on fabrics and other materials. Additional sources include the use and disposal of products containing these PFAS, such as fire-fighting foams.	Some people who drink water containing these PFAS in excess of the MCL may experience certain adverse effects. These could include effects on the liver, blood, immune system, thyroid, and fetal development. These PFAS may also elevate the risk of certain cancers.

(b) Table 2 - Unregulated Contaminants Chart.

Sources to Drinking Water and Health Effects

Key:
CASRN - Chemical Abstract Services Registry Number
CCR – Consumer Confidence Report
ORSG - Office of Research and Standards Guideline
mg/L - milligrams per liter (same as ppm)
ppm - parts per million
ppb - parts per billion
ppt - parts per trillion
pCi/L - Picocuries per liter

…

* There is no ORS Guideline issued as yet for these contaminants. Please contact the MassDEP Office of Research and Standards (ORS) at 617-292-5598 for health risk information for these chemicals. Other useful guidance can be found on the Department's and EPA's websites~~at http://www.mass.gov/dep/water/drinking/standards/orsg.htm and http://water.epa.gov/drink/standards/hascience.cfm~~.

(c) Table 3 - Secondary Contaminants Chart.

Sources to Drinking Water and Health and/or Aesthetic Effects

…

[5] EPA has established a lifetime "Health Advisory" (HA) of 0.3 mg/L and an acute HA at 1.0 mg/L for Manganese and this HA contains a precautionary statement that "for infants younger than six months, the lifetime Health Advisory of 0.3 mg/L be used even for an acute exposure of ten days, because of the concerns for differences in manganese content in human milk and formula and the possibility of a higher absorption and lower excretion in young infants." MassDEP extended that age to one year out of concerns for formula use up to that age and the potential susceptibility of this early life stage to excessive manganese exposure and potential resultant toxicity.

Please go to EPA's website ~~http://water.epa.gov/drink/contaminants/secondarystandards.cfm~~ for additional information on secondary contaminants.

…

22.20A: Surface Water Treatment Rule

…

(2) Criteria for Avoiding Filtration. A Supplier of Water that uses a Surface Water Source must meet all of the conditions in 310 CMR 22.20A(2)(a) and (b) and is subject to 310 CMR 22.20A(2)(c) beginning June 29, 1991, unless the Department has notified it in writing that Filtration is required. A Supplier of Water that uses a groundwater source under the direct influence of surface water must meet all of the conditions in 310 CMR 22.20A(2)(a) and (b) and is subject to 310 CMR 22.20A(2)(c) beginning 18 months after the Department determines that it is under the direct influence of surface water, or June 29, 1991, whichever is later, unless the Department has notified it in writing that Filtration is required. If the Department determines in writing, before June 29, 1991 that Filtration is required, the Supplier of Water must have installed Filtration and meet the criteria for filtered systems specified in 310 CMR 22.20A(3)(b) and (4) by June 29, 1993. Within 18 months of the failure of a system using a Surface Water Source or a groundwater source under the direct influence of surface water to meet any one of the requirements in 310 CMR 22.20A(2)(a) and (b) or after June 29, 1993, whichever is later, the Supplier of Water must have installed Filtration and meet the criteria for filtered systems specified in 310 CMR 22.20A(3)(b) and (4).

…

(c) Treatment Technique Violations.

1. A Supplier of Water shall be deemed in violation of a Treatment Technique requirement if it:

a. fails to meet any one of the criteria in 310 CMR 22.20A(2)(a) or (b) and/or ~~which~~ has been notified by the Department ~~has notified~~ in writing that Filtration is required; and~~or~~

…

(3) Disinfection. A Supplier of Water that uses a Surface Water Source and does not provide Filtration treatment must provide the Disinfection treatment specified in 310 CMR 22.20A(3)(a) beginning December 29, 1991, unless the Department notifies it in writing that Filtration is required. A Supplier of Water that uses a groundwater source under the direct influence of surface water and does not provide Filtration treatment must provide Disinfection treatment specified in 310 CMR 22.20A(3)(a) beginning December 29, 1991, or 18 months after the Department determines that the groundwater source is under the influence of surface water, whichever is later, unless the Department has notified it in writing that Filtration is required. If the Department has determined that Filtration is required, the Supplier of Water must comply with any interim Disinfection requirements the Department deems necessary before Filtration is installed. A Supplier of Water that uses a Surface Water Source that provides Filtration treatment must provide the Disinfection treatment specified in 310 CMR 22.20A(3)(b) beginning June 29, 1993, or beginning when Filtration is installed, whichever is later. A Supplier of Water that uses a groundwater source under the direct influence of surface water and provides Filtration treatment must provide Disinfection treatment as specified in 310 CMR 22.20A(3)(b) by June 29, 1993, or beginning when Filtration is installed, whichever is later. Failure to meet any requirement in 310 CMR 22.20A(3) after the applicable date is a Treatment Technique violation.

(a) Disinfection requirements for Public Water Systems that do not provide Filtration. A Supplier of Water that does not provide Filtration treatment must provide Disinfection treatment as follows:

…

4. The Residual Disinfectant Concentration in the Distribution System measured as free chlorine, total chlorine, combined chlorine, or chlorine dioxide, as specified in 310 CMR 22.20A(5)(a)2. and (b)6., cannot be undetectable in more than 5% of the samples each month, for any two consecutive months that the system serves water to the public. Water in the Distribution System with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in 310 CMR 22.20A(5)(a)1., is deemed to have a detectable Disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5% in one month, for any two consecutive months.

$$V = \frac{c + d + e}{a + b} x\ 100$$

Commented [A2]: Swapped original image with the immediately following image in order to add a space after "=" sign. (the equations in both images are the same)

Where:

a = number of instances where the Residual Disinfectant Concentration is measured;
b = number of instances where the Residual Disinfectant Concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
c = number of instances where the Residual Disinfectant Concentration is measured but not detected and no HPC is measured;
d = number of instances where the Residual Disinfectant Concentration is measured but not detected and where the HPC is >500/ml; and
e = number of instances where the Residual Disinfectant Concentration is not measured and HPC is >500/ml.

…

(5) Analytical and Monitoring Requirements.

(a) Analytical Requirements. Only the analytical method(s) specified in 310 CMR 22.20A(5)(a), or otherwise approved by EPA, may be used to demonstrate compliance with the requirements of 310 CMR 22.20A(2)~~,~~ through (4). Measurements for pH, temperature, Turbidity, and Residual Disinfectant Concentrations must be conducted by a certified operator or a person approved in writing by the Department based upon having been provided relevant and appropriate training. Measurements for total coliform, fecal coliform, and HPC must be conducted by a laboratory certified by the Department to do such analyses. The following procedures shall be performed in accordance with the publications listed in the 310 CMR 22.20A(6). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the methods published in *Standard Methods for the Examination of Water and Wastewater* may be obtained from the American Public Health Association, 1015 Fifteenth Street, N.W., Washington, D.C. 20005; copies of the Minimal Medium ONPG MUG Method as set forth in the article *National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliform and Escherichia coli from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method* (Edberg *et al.*), Applied and Environmental Microbiology, Volume 54, pp.1594 1601, June 1988 (as amended under Erratum, Applied and Environmental Microbiology, Volume 54, p. 3197, December 1988), may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, Colorado, 80235; and copies of the Indigo Method as set forth in the article *Determination of Ozone in Water by the Indigo Method* (Bader and Hoigne), may be obtained from Ozone Science & Engineering, Pergamon Press Ltd., Fairview Park, Elmsford, New York 10523. Copies may be inspected at the U.S. Environmental Protection Agency, Room EB15, 401 M Street, S.W., Washington, D.C. 20460 or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700 Washington, D.C.

1. Public Water Systems must conduct analysis of pH and temperature in accordance with one of the methods listed in 310 CMR 22.06B(10). Public Water Systems must conduct analysis of total coliforms, fecal coliforms, Heterotrophic bacteria, and Turbidity in accordance with one of the following analytical methods and by using analytical test procedures contained in Technical Notes on Drinking Water Methods, EPA-600/R-94-173, October 1994, which is available ~~at~~ from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242-0419 or the NSCEP's website~~NTIS PB95-104766~~.

Organism	Methodology	Citiation[1]
Total Coliform[2]	Total Coliform Fermentation Technique[3, 4, 5]	9221 A, B, C
	Total Coliform Membrane Filter Technique[6]	9222 A, B, C
	ONPG-MUG Test[7]	9223
Fecal Coliforms[2]	Fecal Coliform Procedure[8]	9221 E
	Fecal Coliform Filter Procedure	9222 D
Heterotrophic bacteria[2]	Pour Plate Method	9215 B
	SimPlate[11]	~~2130 B~~
Turbidity[13]	Nephelometric Method	2130 B~~180.1~~[9]
		180.1[9]~~Method 2~~[10]
	Nephelometric Method	Method 2[10]~~10133~~[12]
	Great Lakes Instruments	10133[12]
	Hach Filter Trak	

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1, 6, 7, 9 and 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, 1200 Pennsylvania Ave., NW., Washington, DC 20460 (Telephone: 202-260-3027); or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, D.C. 20408.

[1] Except where noted, all methods refer to *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. The cited methods published in any of these three editions may be used. In addition, the following Standard Methods O~~o~~nline versions may also be used: 2130 B-01, 9215 B-00, 9221 A, B, C, E-99, 9222 A, B, C, D-97, and 9223 B-97. ~~Standard Methods Online are available at http://www.standardmethods.org.~~ The year in which each method was approved by the standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only Online versions that may be used.

…

Residual	Methodology	Methods SM[1]	SM Online[2]	Other
Free Chlorine	Amperometric Titration	4500-Cl D	4500-C1 D-00	D 1253-03[3]
	DPD Ferrous Titrimetric	4500-Cl F	4500-C1 F-00	
	DPD Colorimetric	4500-Cl G	4500-C1 G-00	
~~Total Chlorine~~	Syringaldazine (FACTS)	4500-Cl H	4500 C1 H-00	
Total Chlorine	Amperometric Titration	4500-Cl D	4500 C1 D-00	D 1253-03[3]
	Amperometric Titration (low level measurement)	4500-Cl E	4500 C1 E-00	
	DPD Ferrous Titrimetric	4500-Cl F	4500 C1 F-00	
~~Chlorine Dioxide~~	DPD Colorimetric	4500-Cl G	4500 C1 G-00	
	Iodometric Electrode	4500-Cl I	4500 C1 I-00	
Chlorine Dioxide	Amperometric Titration	4500-ClO_2 C	4500-ClO_2 C-00	
	DPD Method	4500-ClO_2 D		
	Amperometric Titration	4500-ClO_2 E	4500 C1O_2 E-00	
~~Ozone~~	Spectrophotometric	~~4500-O_3 B~~		327.0, Revision 1.1[4]
Ozone	Indigo Method	4500-O_3 B	4500-O_3 B-97	

[1] All the listed Disinfectant residual methods are contained in the 18th, 19th, and 20th editions of *Standard Methods for the Examination of Water and Wastewater*, 1992, 1995, and 1998; the cited methods published in any of these three editions may be used.

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

[3] 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.

[4] EPA Method 327.0, Revision 1.1, *Determination of ~~c~~Chlorine Dioxide and Chlorite Ion in Drinking Water Using Lissamine Green B and Horseradish Peroxidase with Detection by Visible Spectrophotometry*, USEPA, May 2005, EPA 815-R-05-008. Available online from EPA's NSCEP~~at http://www.epa.gov/safewater/methods/sourcalt.html~~.

…

(c) Monitoring Requirements for Systems Using Filtration Treatment. A Supplier of Water that uses a Surface Water Source or a groundwater source under the influence of surface water and provides Filtration treatment must monitor in accordance with 310 CMR 22.20A(5)(c) beginning June 29, 1993, or when Filtration is installed, whichever is later.

…

2. The Residual Disinfectant Concentration of the water entering the Distribution System must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in *lieu* of continuous monitoring, but for no more than five working days following the failure of the equipment. Systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:

System size by population	Samples/day* =
< 500	1
501 - 1,000	2
1,001 - 2,500	3
2,501 - 3,300	4

…

(6) Reporting and Recordkeeping Requirements.

(a) A Supplier of Water that uses a Surface Water Source and does not provide Filtration treatment must report monthly to the Department the information specified in 310 CMR 22.20A(6)(a) beginning May 1, 1990, unless the Department has notified the Supplier of Water in writing that Filtration is required in writing, in which case the Department may specify alternative reporting requirements, as appropriate, until Filtration is in place. A Supplier of Water that uses a groundwater source under the direct influence of surface water and does not provide Filtration treatment must report monthly to the Department the information specified in 310 CMR 22.20A(6)(a) beginning December 31, 1990 or six months after the Department determines that the groundwater source is under the direct influence of surface water, whichever is later, unless the Department has notified it in writing that Filtration is required in which case the Department may specify alternative reporting requirements, as appropriate, until Filtration is in place.

1. Source water quality information 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:

a. The cumulative number of months for which results are reported.

b. The number of fecal and/or total coliform samples, whichever are analyzed during the month (if a system monitors for both, only fecal coliform must be reported), the dates of sample collection, and the dates when the Turbidity level exceeded one NTU.

c. The number of samples during the month that had equal to or less than 20/100 ml fecal coliform and/or equal to or less than 100/100 ml total coliform, whichever are analyzed.

d. The cumulative number of fecal or total coliform samples, whichever are analyzed, during the previous six months the system served water to the public.

e. The cumulative number of samples that had equal to or less than 20/100 ml fecal coliform or equal to or less than 100/100 ml total coliform, whichever are analyzed, during the previous six months the system served water to the public.

f. The percentage of samples that had equal to or less than 20/100 ml fecal coliform or equal to or less than 100/100 ml total coliform, whichever are analyzed, during the previous six months the system served water to the public.

g. The maximum Turbidity level measured during the month, the date(s) of occurrence for any measurement(s) which exceeded five NTU, and the date(s) the occurrence(s) was reported to the Department.

h. For the first 12 months of recordkeeping, the dates and cumulative number of events during which the Turbidity exceeded five NTU, and after one year of recordkeeping for Turbidity measurements, the dates and cumulative number of events during which the Turbidity exceeded five NTU in the previous 12 months the system served water to the public.

i. For the first 120 months of recordkeeping, the dates and cumulative number of events during which the Turbidity exceeded five NTU, and after ten years of recordkeeping for Turbidity measurements, the dates and cumulative number of events during which the Turbidity exceeded five NTU in the previous 120 months the system served water to the public.

2. Disinfection information specified in 310 CMR 22.20A(5)(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:

a. For each day, the lowest measurement of Residual Disinfectant Concentration in mg/l in water entering the Distribution System.

b. The date and duration of each period when the Residual Disinfectant Concentration in water entering the Distribution System fell below 0.2 mg/l and when the Department was notified of the occurrence.

c. The daily Residual Disinfectant Concentration(s) (in mg/l) and Disinfectant Contact Time(s) (in minutes) used for calculating the CT value(s).
d. If chlorine is used, the daily measurement(s) of pH of disinfected water following each point of chlorine Disinfection.
e. The daily measurement(s) of water temperature in C following each point of Disinfection.
f. The daily CTcalc and CTcalc/$CT_{99.9}$ values for each Disinfectant measurement or sequence and the sum of all CTcalc/$CT_{99.9}$ values ((CTcalc/$CT_{99.9}$)) before or at the first customer.
g. The daily determination of whether Disinfection achieves adequate *Giardia* cyst and Virus inactivation, *i.e.*, whether (CTcalc/$CT_{99.9}$) is at least 1.0 or, where Disinfectants other than chlorine are used, other indicator conditions that the Department determines are appropriate, are met.
h. The following information on the samples taken in the Distribution System in conjunction with total coliform monitoring pursuant to 310 CMR 22.20A(3):
i. Number of instances where the Residual Disinfectant Concentration is measured;
ii. Number of instances where the Residual Disinfectant Concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
iii Number of instances where the Residual Disinfectant Concentration is measured but not detected and no HPC is measured;
iv. Number of instances where the Residual Disinfectant Concentration is measured but not detected and where HPC is >500/ml;
v. Number of instances where the Residual Disinfectant Concentration is not measured and HPC is >500/ml;
vi. For the current and previous month the system served water to the public, the value of "V" in the following formula:

…

(b) A Supplier of Water that uses a Surface Water Source or a groundwater source under the direct influence of surface water and provides Filtration treatment must report monthly to the Department the information specified in 310 CMR 22.20A(6)(b) beginning June 29, 1993, or when Filtration is installed, whichever is later.

…

2. Disinfection information specified in 310 CMR 22.20A(5)(c) 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:
a. For each day, the lowest measurement of Residual Disinfectant Concentration in mg/l in water entering the Distribution System.
b. The date and duration of each period when the Residual Disinfectant Concentration in water entering the Distribution System fell below 0.2 mg/l and when the Department was notified of the occurrence.
c. The following information on the samples taken in the Distribution System in conjunction with total coliform monitoring pursuant to 310 CMR 22.20A(3):
i. Number of instances where the Residual Disinfectant Concentration is measured;
ii. Number of instances where the Residual Disinfectant Concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;
iii. Number of instances where the Residual Disinfectant Concentration is measured but not detected and no HPC is measured;
iv. Number of instances where Residual Disinfectant Concentration is measured but not detected and where HPC is >500/ml;
v. Number of instances where the Residual Disinfectant Concentration is not measured and HPC is >500/ml;
vi. For the current and previous month the system serves water to the public, the value of "V" in the following formula:

…

22.20B: Surface Water Supply Protection

…

(2) On and after January 1, 2001, a public water system shall prohibit the following new or expanded land uses within the Zone A of its surface water sources.
(a) All underground storage tanks,
(b) Above-ground storage of liquid hazardous material as defined in M.G.L. c. 21E, or liquid propane or liquid petroleum products, except as follows:
1. The storage is incidental to:
a. normal household use, outdoor maintenance, or the heating of a structure;
b. use of emergency generators;
c. a response action conducted or performed in accordance with M.G.L. c. 21E and 310 CMR 40.000: *Massachusetts Contingency Plan* ~~and which is exempt from a ground water discharge permit pursuant to 314 CMR 5.05(14)~~; and

…

(c) Treatment or disposal works subject to 314 CMR 3.00: *Surface Water Discharge Permit Program* or 5.00: *Ground Water Discharge Permit Program*, except the following:

…

3. treatment works approved by the Department designed for the treatment of contaminated ground or surface waters and operated in compliance with 314 CMR 5.05(3), (15) or (16~~3~~).

…

(4) No stabling, hitching, standing, feeding or grazing of livestock or other domestic animals shall be located, constructed, or maintained within 100 feet of the bank of a surface water source or tributary thereto. Owners and operators of agricultural operations should consult the Massachusetts Department of Agricultural Resources *On-farm Strategies to Protect Water Quality - An Assessment & Planning Tool for Best Management Practices* (~~December 1996~~October 1999) for information about technical and financial assistance programs related to erosion and sediment control and nutrient, pest, pesticide, manure, waste, grazing, and irrigation management.

…

22.20C: Surface Water Supply Protection for New and Expanded Class A Surface Water Sources

…

(2) Restricted Activities upon Surface Water Sources and Within Protection Zones. Required Surface Water Protection Controls Applicable to Zone A: Surface water protection zoning and nonzoning controls submitted to the Department in accordance with 310 CMR 22.20C(1), shall collectively prohibit the siting of the following new land uses within Zone A:

(a) land uses described in 310 CMR 22.20B(2);

(b) facilities that, through their acts or processes, generate, treat, store or dispose of hazardous waste that are subject to M.G.L. c. 21C and 310 CMR 30.000: *Hazardous Waste*, except for the following:

1. very small quantity generators, as defined by 310 CMR 30.000: *Hazardous Waste*;
2. treatment works approved by the Department designed in accordance with 314 CMR 5.00: *Ground Water Discharge Permit Program* for the treatment of contaminated ground or surface waters;

(c) sand and gravel excavation operations;

(d) uncovered or uncontained storage of fertilizers;

(e) uncovered or uncontained storage of road or parking lot de-icing and sanding materials;

(f) storage or disposal of snow or ice, removed from highways and streets outside the Zone A, that contains deicing chemicals;

(g) uncovered or uncontained storage of manure;

(h) junk and salvage operations;

(i) motor vehicle repair operations;

(j) cemeteries (human and animal) and mausoleums;

(k) solid waste combustion facilities or handling facilities as defined at 310 CMR 16.00: *Site Assignment Regulations for Solid Waste Facilities*;

(l) land uses that result in the rendering impervious of more than 15%, or more than 20% with artificial recharge, or 2500 square feet of any lot, whichever is greater; and

(m) commercial outdoor washing of vehicles, commercial car washes.

…

22.20D: Interim Enhanced Surface Water Treatment Rule

…

(3) Disinfection Profiling and Benchmarking. 310 CMR 22.20D(3) establishes criteria that the Department will use to determine public water systems that are required to profile. A supplier of water subject to the requirements of 310 CMR 22.20D(3) had to determine its TTHM annual average using the procedure in 310 CMR 22.20D(3)(a) and its HAA5 annual average using the procedure of 310 CMR 22.20D(3)(b). The annual average is the arithmetic average of the quarterly averages of four consecutive quarters of monitoring.

(a) Determination of Systems Required to Profile.

1. The TTHM annual average is the annual average determined during the same period as was used for the HAA5 annual average:
   a. A supplier of water who collected data under the provisions of the "Information Collection Rule"(ICR) was required to use the results of the samples collected during the last four quarters of required monitoring under the "disinfection byproduct and related monitoring" of the ICR.
   b. A supplier of water who used previously collected~~"grandfathered"~~ HAA5 occurrence data that met the provisions of 310 CMR 22.20D(3)(a)2.b. shall use TTHM data collected at the same time under the provisions of 310 CMR 22.07E.

…

(b) Disinfection Profiling.

…

4. The supplier of water shall calculate the total inactivation ratio as follows:
   a. If the supplier of water uses only one point of disinfectant application, the supplier of water may determine the total inactivation ratio for the disinfection segment based on either of the methods below:
      (i) Determine one inactivation ratio $CTcalc/CT_{99.9}$ before or at the first customer during peak hourly flow; or,
      (ii) Determine successive $CTcalc/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the supplier of water shall calculate the total inactivation ratio by determining $CTcalc/CT_{99.9}$ for each sequence and then add the CTcalc/CT 99.9 values together:

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

b. If the supplier of water uses more than one point of disinfectant application before the first customer, the supplier of water shall determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The supplier of water shall calculate the $CTcalc/CT_{99.9}$ value of each segment and ~~S~~$\sum(CTcalc/CT_{99.9})$ using the method in 310 CMR 22.20D(3)(b)4.a.

…

(4) Filtration. Each supplier of water using a system subject to the requirements of 310 CMR 22.20D that does not meet all of the criteria of 310 CMR 22.20D(2) and the criteria in 310 CMR 22.20A(2) for avoiding filtration shall provide treatment consisting of both disinfection, as specified in 310 CMR 22.20A(3)(b), and filtration treatment that complies with the requirements of 310 CMR 22.20A(4)(b) or (c) and 22.20D(4)(a) or (b) and by December 31, 2001.

…

(b) Filtration ~~t~~Technologies ~~o~~Other than ~~c~~Conventional ~~f~~Filtration ~~t~~Treatment, ~~d~~Direct ~~f~~Filtration, ~~s~~Slow ~~s~~Sand ~~f~~Filtration, or ~~d~~Diatomaceous ~~e~~Earth ~~f~~Filtration.

…

22.20F: Long Term 1 Enhanced Surface Water Treatment Rule

…

(4) Disinfection Profiling.

...

(e) Use the tables in 310 CMR 22.20A(5)(b)3.e. to determine the appropriate $CT_{99.9}$ value. The supplier of water shall calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine the log inactivation of *Giardia lamblia*:

1. If the supplier of water uses only one point of disinfectant application, the supplier of water shall determine the total inactivation ratio for the disinfection segment based on either of the following methods:

a. Determine one inactivation ratio ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow; or

b. Determine successive $CTcalc/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining ($CTcalc/CT_{99.9}$) for each sequence and then add the ($CTcalc/CT_{99.9}$) values together to determine (~~3~~$\sum CTcalc/CT_{99.9}$).

…

(6) Combined Filter Effluent Requirements.

…

(b) Each supplier of water that serves fewer than 10,000 people using a surface water source or ground water source under the direct influence of surface water is required to filter, and each supplier of water that utilizes filtration other than slow sand filtration or diatomaceous earth filtration shall meet two strengthened CFE turbidity limits as follows:

1. The first CFE turbidity limit is a "95th percentile" turbidity limit that the system shall meet in at least 95% of the turbidity measurements taken each month. Measurements must continue to be taken as described in 310 CMR 22.20A(5)(a~~b~~)~~1.~~ and (c)~~3~~. Monthly reporting shall be completed according to 310 CMR 22.20F(8).

…

(7) Individual Filter Turbidity Requirements.

…

(c) If the system only consists of one or two filters, the supplier of water may conduct continuous monitoring of the CFE turbidity in lieu of individual filter effluent turbidity monitoring. Continuous monitoring shall meet the same requirements set forth in 310 CMR 22.20F(7)(a)1. through 4. and (b).

…

22.20G: Long Term Two Enhanced Surface Water Treatment Rule

…

(2) Source Water Monitoring.

…

(h) Previously Collected ~~Grandfathering~~ Monitoring Data. Systems may use ~~(grandfather)~~ monitoring data collected prior to the applicable monitoring start date in 310 CMR 22.20G(2)(c) to meet the initial source water monitoring requirements in 310 CMR 22.20G(a). Previously collected~~Grandfathered~~ data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under 310 CMR 22.20G(2)(h) must meet the requirements in 310 CMR 22.20G(8).

…

(8) Use of ~~Grandfathering~~ Previously Collected Data.

(a) 1. Systems may use sample results collected before the system is required to begin monitoring to comply with the initial source water monitoring requirements of 310 CMR 22.20G(2)(a) ~~by grandfathering sample results collected before the system is required to begin monitoring (i.e., previously collected data). To be grandfathered,~~ with the approval of the Department based upon

the sample results and analysis ~~must~~ meeting the criteria in 310 CMR 22.20G(8) ~~and the Department must approve~~.

2. A filtered system may use previously collected~~grandfather~~ *Cryptosporidium* samples to meet the requirements of 310 CMR 22.20G(2)(a) when the system does not have corresponding *E. coli* and Turbidity samples. A system that uses previously collected~~grandfathers~~ *Cryptosporidium* samples without *E. coli* and Turbidity samples is not required to collect *E. coli* and Turbidity samples when the system completes the requirements for *Cryptosporidium* monitoring under 310 CMR 22.20G(2)(a).

…

(e) Sampling Frequency. *Cryptosporidium* samples were collected no less frequently than each calendar month on a regular schedule, beginning no earlier than January 1999. Sample collection intervals may vary for the conditions specified in 310 CMR 22.20G(3)(b)1. and 2. if the system provides documentation of the condition when reporting monitoring results.

1. The Department may approve the use ~~grandfathering~~ of previously collected data where there are time gaps in the sampling frequency if the system conducts additional monitoring the Department specifies to ensure that the data used to comply with the initial source water monitoring requirements of 310 CMR 22.20G(2)(a) are seasonally representative and unbiased.

2. Systems may use ~~grandfather~~ previously collected data where the sampling frequency within each month varied. If the *Cryptosporidium* sampling frequency varied, systems must follow the monthly averaging procedure in 310 CMR 22.20G(11)(b)5. or 310 CMR 20G(13)(a)3., as applicable, when calculating the bin classification for filtered systems or the mean *Cryptosporidium* concentration for unfiltered systems.

(f) Reporting the Use of Previously Collected Monitoring Results ~~for Grandfathering~~. Systems that request to use ~~grandfather~~ previously collected monitoring results must report the following information by the applicable dates listed in 310 CMR 22.20G(3).

1. Systems must report that they intend to submit and use previously collected monitoring results ~~for grandfathering~~. This report must specify the number of previously collected results the system will submit, the dates of the first and last sample, and whether a system will conduct additional source water monitoring to meet the requirements of 310 CMR 22.20G(2)(a). Systems must report this information no later than the date required by the sampling schedule under 310 CMR 22.20G(3).

2. Systems must report the use of previously collected monitoring results ~~for grandfathering~~, along with the associated documentation listed in 310 CMR 22.20G(8)(f)(2)a. through d., no later than two months after the applicable date listed in 310 CMR 22.20G(2)(c).

…

(g) If the Department determines that a previously collected data set submitted for use ~~grandfathering~~ was generated during source water conditions that were not normal for the system, such as a drought, the Department may disapprove the data. Alternatively, the Department may approve the previously collected data if the system reports additional source water monitoring data, as determined by the Department, to ensure that the data set used under 310 CMR 22.20G(11) or (13) represents average source water conditions for the system.

…

(10) Developing the Disinfection Profile and Benchmark.

…

(d) Systems must calculate the total inactivation ratio for *Giardia lamblia* as specified in 310 CMR 22.20G(10)(d)1. through 3.

…

2. Systems using more than one Point of Disinfectant Application before the first customer must determine the CT value of each Disinfection segment immediately prior to the next Point of Disinfectant Application, or for the final segment, before or at the first customer, during peak hourly flow. The $(CTcalc/CT_{99.9})$ value of each segment and $(\sum(CTcalc/CT_{99.9}))$ must be calculated using the method in 310 CMR 22.20G(10)(d)1.b.

…

(15) Requirements for Uncovered Finished Water Storage Facilities.

…

(c) Systems must meet the conditions of 310 CMR 22.20G(15)(c)1. or 2. for each Uncovered Finished Water Storage Facility or be in compliance with a Department-approved schedule to meet these conditions no later than April 1, 2009.

1. Systems must cover any Uncovered Finished Water Storage Facility.

2. Systems must treat the discharge from the Uncovered Finished Water Storage Facility to the Distribution System to achieve inactivation and/or removal of at least 4-log Virus, 3-log *Giardia lamblia*, and 2-log *Cryptosporidium* using a protocol approved by the Department.

…

(22) Additional Filtration Toolbox Components.

(a) Bag Filters and Cartridge Filters. A Supplier of Water using Bag Filters or Cartridge Filters that treat the entire plant flow taken from a Surface Water Source, or Groundwater under the Direct Influence of Surface Water Source, subject to the Department's review and written approval, shall receive *Cryptosporidium* treatment credit, in accordance with the following:

…

2. Challenge Testing and Reporting Procedures.

…

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

$$LRV = \log_{10}(C_f) - \log_{10}(C_p),$$

Where:
LRV = log removal value demonstrated during challenge testing;
C_f = the feed concentration measured during the challenge test; and
C_p = the filtrate concentration measured during the challenge test.

In applying this equation, the same units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, then the term C_p must be set equal to the detection limit;

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

…

(b) Membrane Filtration. A Supplier of Water using Membrane Filtration, subject to the Department's review and written approval, shall receive *Cryptosporidium* treatment credit, in accordance with the following:

…

2. Testing and Reporting Procedures.

a. Challenge Testing. The membrane used by the Public Water System must undergo challenge testing to evaluate removal efficiency and the Supplier of Water must report the results of challenge testing to the Department. Suppliers of Water may use data from challenge testing conducted prior to January 5, 2006, if the prior testing was consistent with the criteria specified in 310 CMR 22.20G(22)(b)2.a.i. through viii. Challenge testing must be conducted in accordance with the following:

…

v. removal efficiency of a membrane module must be calculated from the challenge test results and expressed as a log removal value according to the following equation:

$$LRV = \log_{10}(C_f) - \log_{10}(C_p),$$

Where:
LRV = log removal value demonstrated during the challenge test;
C_f = the feed concentration measured during the challenge test; and
C_p = the filtrate concentration measured during the challenge test.

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

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

…

(23) Inactivation Toolbox Components.

(a) Inactivation by Chlorine Dioxide and Ozone. A Supplier of Water using chlorine dioxide or ozone, subject to the Department's review and written approval, shall receive *Cryptosporidium* treatment credit, in accordance with the following:

1. Calculation of Credit.

a. A Public Water System meeting the chlorine dioxide CT value in 310 CMR 22.20G(23): *Table 7* for the applicable water temperature shall receive the corresponding *Cryptosporidium* treatment credit.

310 CMR 22.20G: *Table 7*

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

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

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

b. A Public Water System meeting the ozone CT value in 310 CMR 22.20G: *Table 8* for the applicable water temperature shall receive the corresponding *Cryptosporidium* treatment credit.

310 CMR 22.20G: *Table 8*
CT VALUES (MG MIN/L) FOR *Cryptosporidium* INACTIVATION BY OZONE[1]

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

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

…

(b) Inactivation by Ultraviolet Light. A Supplier of Water using UV light, subject to the Department's review and written approval, shall receive *Cryptosporidium*, *Giardia lamblia*, and Virus treatment credits, in accordance with the following:

…

2. Water Quality Monitoring. Prior to validation testing, a Supplier of Water shall satisfy the following requirements:

…

b. ensure monitoring:

i. represents storm events, reservoir turnover, seasonal changes, source blending and any variation in upstream treatment;

ii. is conducted up to the period of time specified in 310 CMR 22.20G: *Table 10*. The Department may approve a shorter period of monitoring if the Supplier of Water can demonstrate that the water quality is stable and does not change seasonally; and

iii. meets the water quality limits, specified in 310 CMR 22.20G: *Table 10*:

…

22.21: Groundwater Supply Protection

…

(3) Requirements for all New and Existing Groundwater Sources

…

(b) Zone I. All suppliers of water shall acquire ownership or control of sufficient land around wells, infiltration galleries, springs and similar sources of ground water used as sources for drinking water to protect the water from contamination. This requirement shall generally be deemed to have been met if all land within Zone I is under the ownership or control of the supplier of water. Current and future land uses within the Zone I shall be limited to those land uses directly related to the provision of ~~the~~ public drinking water ~~system~~ or to other land uses which the public water system has demonstrated have no significant impact on water quality. The Department may require greater distances or permit lesser distances than the Zone I distances set forth at 310 CMR 22.02, if the Department deems such action necessary or sufficient to protect public health. No new underground storage tanks for petroleum products shall be located within Zone I. Once a Zone I has been approved, the Supplier of Water shall

obtain the Department's written approval prior to allowing any change in activity or use of the~~changing any~~ land ~~use~~ within the Zone I or amending any restriction or other limitation applicable to land uses within the Zone I (provided that the restriction or limitation is within the control of the Supplier of Water), or selling, leasing, assigning, or otherwise disposing of any land within the Zone I.

(4) Inspection and Enforcement

(a) Each supplier of water, for each well and wellfield under its control, shall annually survey the land uses within ~~Zones I, II and III, or within the Interim Wellhead Protection Area, for each well and wellfield under its control~~ the following areas~~areas described in 1. and either 2. or 3., below:~~

1. the Zone I and the Zone II; or
2. the Zone I and the Zone III ~~or,~~ where the Supplier of Water has obtained a Zone II waiver pursuant to 310 CMR 22.21(1)(f), or~~the Zone III~~

~~1.~~3. the Zone I and Interim Wellhead Protection Area

(b) A supplier of water shall submit to the Department an annual report that identifies for each well and wellfield under its ownership ~~and~~ or control the presence of new land uses within the Zones I, II and III, or within the Interim Wellhead Protection Area, that could adversely impact water quality. The annual reports shall be submitted as part of or, if appropriate, as a supplement to, the Annual Statistical Report pursuant to the requirements of 310 CMR 22.15(5)~~on Department approved forms by January 31st for the preceding calendar year. The annual reports shall be submitted to the Department's Office of Water Supply at the Regional Office that serves the area where the well, wellfield, or spring is located~~.

(c) A supplier of water shall notify the local board of health or health department within 48 hours of detection of any violation of a statutory or regulatory requirement that may adversely ~~e~~affect its water supply or distribution system, and shall notify the inspector of buildings, building commissioners or local inspector, or the person charged with enforcement of local zoning and nonzoning controls, within 48 hours of detecting any violation of applicable land use restrictions that may adversely ~~e~~affect its water supply or distribution system. Such notices should include the following information:

1. the name of the person in violation;
2. the location where the violation is occurring;
3. the date when the violation was observed;
4. a description of the violation;
5. the legal citation of the requirement or restriction violated; and
6. a description of the actions necessary to remove or remedy the violation and the deadlines for taking such actions.

In addition, the supplier of water shall notify the Department's Drinking Water Program~~Office of Water Supply~~ at the appropriate Regional Office upon giving any notice required by 310 CMR 22.21(4)(c).

(d) A supplier of water shall take appropriate action to determine whether the violation has been removed or remedied and shall notify the Department's Drinking Water Program~~Office of Water Supply~~ at the appropriate Regional Office upon finding that the violation has been removed or remedied.

(5) Variances

…

(b) The Department shall consider the following factors in making the finding necessary to grant a variance pursuant to 310 CMR 22.21(5):

1. the reasonableness of available alternatives to the proposed well, wellfield, or spring;
2. the overall effectiveness of existing land use controls and other protective measures on the proposed well, wellfield, or spring and any other water supply sources used by the supplier of water;
3. the nature and extent of the risk of contamination to the proposed well, wellfield, or spring that would result from the granting of the variance; and
4. whether the variance is necessary to accommodate an overriding community, regional, state or national public interest.

These factors need not be weighed equally, nor must all of these factors be present for the Department to grant a variance. The presence of any single factor may be sufficient for the granting of a variance.

…

22.22: Cross Connections Distribution System Protection

…

(4) Owners' Responsibilities. The owner of any cross connection protected by a double check valve assembly or reduced pressure backflow preventer shall:

(a) Notify the public water system of all cross connections protected by a double check valve assembly or reduced pressure backflow preventer and comply with all necessary approvals and permits from the public water system and/or the Department for the maintenance of cross connections, as specified at 310 CMR 22.22;

(b) Have suitable arrangements made so that inspections of backflow prevention devices and cross connection surveys can be made during regular business hours;

(c) Maintain a spare parts kit and any special tools required for the removal and reassembly of backflow prevention devices;

(d) Provide the necessary labor for inspection and testing by the Certified Backflow Prevention Device Testers or Certified Cross Connection Surveyor;

(e) Overhaul, repair, or replace within 14 days of the initial inspection date and retest pursuant to 310 CMR 22.22(13)(e), any device which fails a test or is found defective;
(f) Submit copies of the Inspection and Maintenance Report Form as required by the public water system.
(g) Maintain on the premises complete records on all devices for the life of said devices including as-built plans and design data sheets; maintain for seven years the Inspection and Maintenance Report Forms for tests conducted by the certified.
(h) Make certain that the cross connection protection device is tested as specified at 310 CMR 22.22(13) or as required by the public water system.

…

(9) Types of Backflow Prevention Devices Required.
(a) Subject to the provisions of 310 CMR 22.22(10): *Table 22-1* shall serve as the guide for the type of protection required.

Table 22-1

AG	- Air Gap	PVB	- Pressure Vacuum Breaker
RPBP	- Reduced Pressure Backflow Preventer	BPIAV	- Backflow Preventer with Intermediate Atmospheric Vent
DCVA	- Double Check Valve Assembly		
AVB	- Atmospheric Vacuum Breaker		

Types of Hazard on Premises	Acceptable Types of Backflow Preventers						Comments*
	AG	RPBP	DCVA	AVB	PVB	BPIAV	
1. Sewage Treatment Plant	X	X					
2. Sewage Pumping Station	X	X					
3. Food Processing	X	X	X*				*If no health hazard exists
4. Laboratories	X	X	X*				*If no health hazard exists
5. Fixtures with hose threads on inlets	X	X	X	X			In addition to an air gap separation, all fixtures that have a threaded hose type connection shall at a minimum, be equipped with a AVB in accordance with 248 CMR 10.14
6. Hospitals, Mortuaries, Clinics	X	X					
7. Plating Facilities	X	X					
8. Irrigation Systems	X	X		X*	X**		Each case should be evaluated individually. *An AVB can be used if no back pressure is possible and no health hazard exists **Pressure Vacuum Breakers can be installed if back pressure is not possible
9. Systems or Equipment Using Radioactive Material	X	X					
10. Submerged Inlets	X	X		X*			*If no health hazard exists and no back pressure is possible
11. Dockside Facilities	X	X					
12. Valved outlets or fixtures with hose attachments	X	X		X*			Each case should be evaluated individually. *If no health hazard exists and no back pressure is possible
13. Commercial Laundries and Dry Cleaners	X	X					
14. Commercial Dishwashing Machines	X	X		X*			*If no health hazard exists
15. High and Low Pressure Boilers	X	X*					*If chemicals are added
16. Low Pressure Heating Boilers						X	Residential and small commercial, having no chemicals added
Types of Hazard on Premises	Acceptable Types of Backflow Preventers						Comments*
	AG	RPBP	DCVA	AVB	PVB	BPIAV	
17. Photo Processing Equipment	X	X					
18. Reservoirs -Cooling Tower Recirculating Systems	X	X					
19. Fire Protection Systems: For cross connection control, fire protection systems may be classified on the basis of water source and arrangement of supplies as follows: a Class 1: Direct connection from public water system mains only; no pumps, tanks, or reservoirs; no physical connection from other water supplies; no antifreeze or other additives of any kind; all sprinkler drains discharge to atmosphere, dry wells, or other safe outlets. These systems may or may not have fire department connections. Refer to 310 CMR 22.22(9)(d)1.	X	X	X				A backflow prevention assembly does not have to be installed on existing fire protection systems installed prior to March 21, 1997, provided that the fire protection system is registered with the public water system, equipped with a UL listed alarm check valve that is properly maintained in accordance with NFPA 25 and has not undergone substantial modification defined within 310 CMR 22.22(9)(d)3. Alarm check maintenance records must be available for inspection by the Department, its designee or the public water system
b Class 2: Same as Class 1 except that booster pumps may be installed in the connections from the street mains. These systems may or may not have fire department connections. Refer to 310 CMR 22.22(9)(a).	X	X	X				A backflow prevention assembly does not have to be installed on existing fire protection system installed prior to March 21, 1997, provided that the fire protection system is registered with the public water system and equipped with a UL listed alarm check valve that is properly maintained in accordance with NFPA 25. Alarm check maintenance records must be available for inspection by the Department, its designee or the public water system
c Class 3: Direct connection from public water system mains, plus one or more of the following: elevated storage tanks; fire pumps taking suction from aboveground covered reservoirs, or tanks; and pressure tanks.	X	X*	X*				*RPBP or DCVA contingent on evaluation of auxiliary supply and on-site system in accordance with 310 CMR 22.22(9)(d)1.
d Class 4: Directly supplied from public water system mains, similar to Class 1 and Class 2 with an auxiliary water supply dedicated to fire department use and available to the	X	X*					*RPBP on evaluation of auxiliary supply and on-site system in accordance with 310 CMR 22.22(9)(d)1.

	premises, such as a nonpotable water source located within 1700 feet of the fire department connection, (FDC).							
e	Class 5: Directly supplied from public water system mains, and interconnected with auxiliary supplies, such as pumps taking suction from reservoirs exposed to contamination, or rivers and ponds; driven wells; mills or other industrial water systems; or where antifreeze or other additives are used.	X*	X*					*RPBP or air gap contingent on evaluation of auxiliary supply and on-site system. Refer to 310 CMR 22.22(9)(d)1.
f	f. Class 6: Combined industrial and fire protection systems supplied from the public water mains only, with or without gravity storage or pump suction tanks.	X	X*			X	X	*RPBP contingent on evaluation of on-site water system. Refer to 310 CMR22.22 (9)(d)1.
g	Residential fire protection systems for one and two family detached dwellings and manufactured homes only. Fire protection systems in three family dwellings meeting NFPA 13D requirements as provided in 780 CMR, Chapter 9, are included in this section.	X	X	X				Non testable devices and flow through systems should be used whenever possible. Systems are typically designed and installed in accordance with NFPA 13D: "Installation of Sprinkler systems in One and Two Family Dwellings and manufactured homes". These systems are authorized to use food grade antifreeze with no additional requirements when potable piping (PB, CPVC, and copper tube) is employed. If non-grade antifreeze is utilized, the system may be classified as a class 5. If a fire department connection is used, the requirements for a class 1 or 2 apply.
Types of Hazard on Premises		Acceptable Types of Backflow Preventers						Comments*
		AG	RPBP	DCVA	AVB	PVB	BPIAV	
h	Residential fire protection systems for other than those described in Table 22-1-19.g.	X	X	X				Fire protection system in this category shall comply with the requirements set forth in class 1 through 4 as appropriate.
20.	Solar Energy Systems	X	X				X*	Residential and small commercial having no chemicals or only USP Glycinecene added to water
21.	Single Jacketed Heat Exchangers	X	X					Each case should be evaluated individually

…

(12) Cross Connection Certification

(a) Cross Connection Backflow Prevention Device Tester. Any person seeking Department certifications as a Backflow Prevention Device Tester in the Commonwealth of Massachusetts shall meet all of the following requirements:

1. pass a written and practical certification examination which is approved by the Department for "Backflow Prevention Device Tester".
2. apply to the Department for certification on the form provided by the Department. This submittal must include payment of the certification fee established by the Department.
3. Application for certification must be submitted to the Department no later than 12 months after the date the applicant received notice of passing a Department approved examination.

…

(c) Any person, upon satisfying the requirements of 310 CMR 22.22(12~~3~~)(a), shall receive from the Department a certificate which indicates that he or she is a:

1. Certified Backflow Prevention Device Tester; or
2. Certified Cross Connection Surveyor; or
~~4.~~3. Combination Certified Backflow Prevention Device Tester/Certified Cross Connection Surveyor.

…

(g) Recertification Requirements. Persons failing to renew their certification within three years from the date that the certificate expired, must retake an examination approved by the Department for recertification.

…

22.23: Use of Non-centralized Treatment Devices and Bottled Water

…

(2) Public Water Systems using bottled water as a condition of obtaining an exemption from the requirements of 310 CMR 22.06(2~~1~~6), 22.07A(1) and 22.07B(1), and must meet the requirements in 310 CMR 22.14(25)

…

(4) A Supplier of Water meeting the following minimum requirements, subject to the Department's review and written approval in accordance with 310 CMR 22.04, may use Point of Use (POU) and/or Point of Entry (POE) devices to comply with an MCL set forth in 310 CMR 22.00 or to achieve a contaminant level identified in accordance with 310 CMR 22.03(8):

(a) the POU or POE device must be owned, controlled, operated and maintained by the Supplier of Water in accordance with 310 CMR 22.00;

~~(a)~~(b) the POU or POE device must be equipped with mechanical warnings device to ensure that customers are automatically notified of operational problems;

~~(b)~~(c) the POU or POE device must be included in the Department's approved list of technologies for small systems and approved in accordance with 310 CMR 22.04(8);

~~(c)~~(d) the POU or POE device must be installed in conformance with 248 CMR 10.00: *Uniform State Plumbing Code*;

~~(b)~~(e) a monitoring plan that ensures that the devices provide health protection equivalent to that provided by central water treatment must be submitted;

~~(d)~~(f) effective technology under a Department-approved plan must be applied. The microbiological safety of the water must be maintained at all times;

~~(e)~~(g) the Supplier of Water must ensure that buildings connected to the system have sufficient POU or POE devices that are properly installed, maintained, and monitored such that all consumers will be protected;

~~(c)~~(h) the POU or POE device must have an adequate certification of performance including field testing or the device has undergone a rigorous engineering design review;

~~(f)~~(i) the design and application of the POU and/or POE devices must consider the potential for increasing concentrations of heterotrophic bacteria in water treated with activated carbon. It may be necessary to use frequent backwashing, post contactor Disinfection, and Heterotrophic Plate Count monitoring to ensure that the microbiological safety of the water is not compromised;

~~(g)~~(j) each building connected to the system must have a POU or POE device that is properly installed, maintained, and monitored. Each building is subject to treatment and monitoring, and the rights and responsibilities of the Public Water System customer convey with title upon sale of property;

~~(d)~~(k) the Supplier of Water must document that all customers are required to or have agreed to participate in the POU and or POE water treatment program. Documentation may include, without limitation, the following:

1. an ordinance that requires the customers to participate in the program; or
2. copies of signed agreements from all customers explicitly agreeing to provide the Supplier of Water with access to their homes or buildings for the purpose of conducting necessary maintenance and sampling activity;

~~(h)~~(l) the Supplier of Water must notify and provide an opportunity for public comment to its customers of the proposed POU and POE treatment program at a public meeting, or an equivalent approved opportunity for public comment;

~~(e)~~(m) the Supplier of Water must submit a continuing education and awareness plan, including all supporting educational materials;

~~(i)~~(n) the Supplier of Water must provide educational materials pursuant to the approved continuing education and awareness plan described in 310 CMR 22.23(4)(m) to new and existing customers summarizing potential health effects of contaminants of concern and the benefits of POU/POE devices, subject to the following:

1. if the water system is a Community Water System educational materials may be provided in their Consumer Confidence Report; and
2. new residents shall be given educational materials within 15 days of beginning water service to such residents;

~~(j)~~(o) the POU device must not be used for the following contaminants: microbiological contaminants, nitrate, volatile organic compounds and radon; and

(p) the POE device must not be used for the following contaminants: microbiological contaminants and nitrate.

…

22.24: Acquisition, Sale, Transfer of Property Interest, or Change in Use of Water Supply Land and Other Land

(1) No supplier of water may sell, lease, assign, or otherwise dispose of, or change the use of, any ~~lands used for water supply purposes~~Water Supply Land without the prior written approval of the Department. The Department will not approve any such disposition or change in use unless the supplier of water demonstrates to the Department's satisfaction that such action will have no significant adverse impact upon the supplier of water's present and future ability to

provide continuous adequate service to consumers under routine and emergency operating conditions, including emergencies concerning the contamination of sources of supply, failure of the distribution system and shortage of supply.

(2) Land Transfers Any sale, transfer of property interest or change in use of ~~land acquired for water supply purposes~~Water Supply Land may also require approval by a 2/3 vote of the Legislature, in addition to Department approval. (Massachusetts Constitution Amend. Art. XCVII, Section 243)

22.24~~3~~: continued

…

(5) The sale, lease, assignment, or other disposal of, or change in use of, land within a Zone I is subject to the requirements set forth in 310 CMR 22.21(3)(b).

(6) Acquisition of Water Supply Land. A Supplier of Water shall obtain the Department's written approval prior to acquiring or taking any land which is, or as a result of such action, becomes Water Supply Land.

(7) Permits and Fees.

(a) A Supplier of Water, prior to any sale, lease, assignment, or other disposition of or change in use of Water Supply Land subject to the Department's approval pursuant to 310 CMR 22.24(1) or any taking or acquisition of Water Supply Land subject to the Department's approval pursuant to 310 CMR 22.24(6), shall obtain a permit using a form approved by the Department.

(1) Permit fees, where applicable, are established by the Department in accordance with 310 CMR 4.00: *Timely Action Schedule and Fee Provisions*.

…

22.26: Ground Water Rule

…

(3) Groundwater Source Microbial Monitoring and Analytical Methods.

(a) Triggered Source Water Monitoring.

1. General Requirements. A groundwater system must conduct triggered source water monitoring if the conditions identified in 310 CMR 22.26(3)(a)1.a. and b. exist.

…

b. The system is notified that a sample collected under 310 CMR 22.05(1)(~~a~~c) through (f) is total coliform-positive and the sample is not invalidated under 310 CMR 22.05(3).

2. Sampling Requirements. A groundwater system must collect, within 24 hours of notification of the total coliform-positive sample, at least one groundwater source sample from each groundwater source in use at the time the total coliform-positive sample was collected, except as provided in 310 CMR 22.26(3)(a)2.b.

…

c. A groundwater system serving 1,000 people or fewer may use a repeat sample collected from a groundwater source to meet both the requirements of 310 CMR 22.05~~(2)~~ and to satisfy the monitoring requirements of 310 CMR 22.26(3)(a)2. for that groundwater source:

i. if *E. coli* is used as a fecal indicator for source water monitoring pursuant to 310 CMR 22.26(3)(a)~~3~~.; and

ii. if the Department, pursuant to 310 CMR 22.05(1)(a)3.d.ii., has approved the use of a single sample for meeting both the triggered source water monitoring requirements in 310 CMR 22.26(3)(a) and the repeat monitoring requirements in 310 CMR 22.05(2).

If the repeat sample collected for the groundwater source is *E. coli* positive, the system shall comply with 310 CMR 22.26(3)(a)4.

d. A groundwater system may use a Raw Water sample collected to meet the requirements of 310 CMR 22.05(1) to satisfy the monitoring requirements of 310 CMR 22.26(3)(a)2. for that groundwater source only if: the Raw Water sample was collected on the same day as the distribution sample that tested total coliform-positive under 310 CMR 22.05(1) and triggered the requirements of 310 CMR 22.26(3)(a)2.; and the Raw Water sample was analyzed in accordance with 310 CMR 22.05(~~3~~6)~~(b)1.~~ and the analytical methods in 310 CMR 22.26(3)(c). If the Raw Water sample is total coliform-negative, no additional testing is required under 310 CMR 22.26 unless otherwise determined by the Department.

…

6. Exceptions to the Triggered Source Water Monitoring Requirements. A groundwater system is not required to comply with the source water monitoring requirements of 310 CMR 22.26(3)(a) if either of the following conditions exists:

…

b. The total coliform-positive sample collected under 310 CMR 22.05(1)~~(a)~~ is collected at a location that meets Department criteria for Distribution System conditions that will cause total coliform- positive samples.

…

(c) Analytical Methods.

1. A groundwater system subject to the source water monitoring requirements of 310 CMR 22.26(3)(a) must collect a Standard Sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical methods used.

2. A groundwater system must analyze all groundwater source samples collected under 310 CMR 22.26(3)(a) and (b) using methods listed in the following table in 310 CMR 26(3)(c)2. for the presence of E. coli or enterococci as specified in 310 CMR 26(3)(a)3. The Department reserves the right to require coliphage analysis.

Analytical Methods for Source Water Monitoring

Fecal Indicator[1]	Methodology	Method Citation
E.coli	Colilert®[3]	SM 9223 B[2]
	Colisure®[3]	SM 9223 B[2]
	Colilert-18®	SM 9223 B
	Membrane Filter Method with MI Agar	EPA Method 1604[4]
	E*Colite Test[5]	
	NA-MUG	SM 9222 G[2]
Enterococci	Membrane Filter Technique	SM 9230C[2]
	Membrane Filter Technique	EPA Method 1600[6]
	Enterolert™[7]	
Coliphage	Two-step Enrichment Presence-Absence Procedure	EPA Method 1601[8]
	Single Agar Layer Procedure	EPA Method 1602[9]

Analyses must be conducted in accordance with the documents 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 NARA's CFR Incorporation by Reference website~~: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html~~.

[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 10ºC 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, 1015 Fifteenth Street, NW, Washington, DC 20005-2605.

[3] Medium is available through IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 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 online in EPA's Docket EPA-HQ-OW-2008-0878 ~~at http://www.epa.gov/nerlcwww/1604sp02.pdf~~ or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW, Washington, D.C. 20460.

[5] A description of the E*Colite Test, *Charm E*Colite Presence/Absence Test for Detection and Identification of Coliform Bacteria and Escherichia coli in Drinking Water*, January 9, 1998, is available from Charm Sciences, Inc, 659 Andover St., Lawrence, MA 01843-1032 or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW, Washington, DC 20460.

[6] EPA Method 1600: *Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl-[beta]-D-Glucoside Agar (mEI) EPA 821-R-02-022* (September 2002) is an approved variation of Standard Method 9230C. The method is available online in EPA's Docket EPA-HQ-OW-2002-0061 ~~at http://www.epa.gov/nerlcwww/1600sp02.pdf~~ or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW, Washington, DC 20460. The holding time and temperature for groundwater samples are specified in footnote [1], rather than as specified in Section 8 of EPA Method 1600.

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

[8] 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 online in EPA's Docket EPA-HQ-OW-2002-0061 ~~at http://www.epa.gov/nerlewww/1601ap01.pdf~~ or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW, Washington, DC 20460.

[9] 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 online in EPA's Docket EPA-HQ-OW-2002-0061 ~~at http://www.epa.gov/nerlewww/1602ap01.pdf~~ or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW, Washington, DC 20460.

…

(4) Treatment Technique Requirements for Groundwater Systems.

…

(b) Compliance Monitoring.

…

3. Monitoring Requirements. A groundwater system subject to the requirements of 310 CMR 22.26(4)(a) or (b)1. or 2. must monitor the effectiveness and reliability of treatment for that groundwater source before or at the first customer as follows:

a. Chemical Disinfection.

…

ii. Groundwater Systems Serving 3,300 or Fewer People. A groundwater system that serves 3,300 or fewer people must monitor the Residual Disinfectant Concentration using analytical methods specified in 310 CMR 22.20A(5)(a)2. at a location approved by the Department and record the ~~r~~Residual Disinfection ~~c~~Concentration each day that water from the groundwater source is served to the public. The groundwater system must maintain the Department-determined 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 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 level. Alternatively, a groundwater system that serves 3,300 or fewer people may monitor continuously and meet the requirements of 310 CMR 22.26(4)(b)3.a.i.