Office of the Registrar of Regulations,
Legislative Council,
State of Delaware

DEPARTMENT OF HEALTH AND SOCIAL SERVICES

DIVISION OF PUBLIC HEALTH

Statutory Authority: 16 Delaware Code, §122(3)c (16 **Del.C.** §122(3)c)
16 **DE Admin. Code** 4462

FINAL

ORDER

4462 Public Drinking Water Systems

NATURE OF THE PROCEEDINGS:

Delaware Health and Social Services ("DHSS") initiated proceedings to adopt the State of Delaware Regulations Public Drinking Water Systems (4462). The DHSS proceedings to adopt regulations were initiated pursuant to 29 **Del.C.** Chapter 101 and authority as prescribed by 16 **Del.C.** §122(3)(c).

On September 1, 2015 (Volume 19, Issue 3), DHSS published in the Delaware *Register of Regulations* its notice of proposed regulations, pursuant to 29 **Del.C.** §10115. It requested that written materials and suggestions from the public concerning the proposed regulations be delivered to DHSS by October 8, 2015, or be presented at a public hearing on September 30, 2015, after which time the DHSS would review information, factual evidence and public comment to the said proposed regulations.

Written comments were received during the public comment period and evaluated. The results of that evaluation are summarized in the accompanying "Summary of Evidence."

SUMMARY OF EVIDENCE

In accordance with Delaware Law, public notices regarding proposed Department of Health and Social Services (DHSS) State of Delaware Regulations Governing Public Drinking Water Systems were published in the *Delaware State News*, the *News Journal* and the Delaware *Register of Regulations*.

Comments from EPA Region III, Drinking Water Branch – see below
Program Response:

All comments listed were addressed through minor technical corrections to the regulations published as proposed in the September 1, Delaware *Register*.

EPA Comments
General Comments
There are numerous locations where references to the Federal regulations at 40 CFR Part 141 do not contain the '40'. For consistency and correctness, a search of the document should be performed to catch these omissions.

Revised Total Coliform Rule (RTCR) portion of the regulations:
Corrections and Typos:

7.4.5.5.4 (Page 82)
The subsection referenced should be 7.4 (written as 7.1)
7.4.7.4 (Page 84)
The subsection referenced should be 7.4.4.5 through 7.4.4.7 (written as 7.4.4.5 through 7.4.4.8)
7.4.8.2.2 (Page 85)
The subsection referenced should be 7.2.1.1.3 (written as 7.2)

Public Notification (PN) and Consumer Confidence Report (CCR) Rules of the regulations:

4.2.2.1.10 contains a reference to subsection 4.2.2.**4**.3 for the standard language to encourage distribution of the notice. This reference should be to subsection 4.2.2.**3**.3.

Subsections 6.3.4.1.4 and 6.3.4.3.2 refer to provisions of 40 CFR Part 141 which no longer exist. These references to Sections **141.142 and 141.143** should be removed.

The Frequency, Tier Designation and Distribution of Public Notification table at 4.2.3 was found to have incorrect references for Part G DBPs. It is therefore recommended at all citations be checked for accuracy. The correct references for part G for DBP, precursors and disinfection residuals is shown below with other Stage 2 comments.

4.2.3.1 (Federal 141 Subpt Q Appendix A Section II Unregulated Contaminant Monitoring B. Nickel) lines are missing in table for Public Notification for nickel monitoring violations.

Surface Water Treatment Rules

Interim Enhanced: no comments

Long Term 1: no comments

Long Term 2: no comments

Disinfectant and Disinfection Byproducts Rule (Stage 1 and 2)

Due to concern for stringency issues, more detailed comments are still being developed. Discussions may need to occur with DHSS in order to resolve differences for Primacy purposes. Below is a list of the typographical errors, provisions with stringency concerns and other recommended revisions:

Less Stringent Provisions of Concern

In Del. 5.1.1 (Federal 141.33) the requirement for record retention does not require that the operator retain the records on the premises or convenient location.

In Del. 9.3.1.1 (Federal 141.64(b)(2)(ii)) the definition of best available technology does not include nanofiltration with molecular weight cutoff <10000 Daltons, or GAC20.

In Del. 12.5 (Federal 141.131(b)(2)(i)) performance evaluation samples should be required for chlorite and bromate.

In Del. 12.5.1 (Federal 141.131(b)(2)(iii)) retains the Stage 1 incorrect performance evaluation acceptance limits for TTHM/HAA5.

In Del 12.7.3.2.2 (Federal 141.132(b)(3)(ii)(B)) no timeline for return from reduced to routine monitoring included. The Delaware cross reference points to Stage 1 DBP return to routine which does not include timing.

Incorrect and incomplete Reference Citations

Delaware Monitoring/Recordkeeping PN table is incorrect for all of entry G for DBP, precursors and disinfection residuals. As an example, DBP M/R violation points to 9.2.3, which does not exist. The table should be revised as shown in the following table:

G. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfection Residuals.13				
1. Total trihalomethanes (TTHMs)	2	9.2.1.2, 9.2.2.2.1.11, 9.3.1.1, subsection 9.2.1.2	3	12.6.1 to 12.6.5, 12.7.1 to 12.7.3, 13.0 to 13.6, 14.0 to 14.9
2. Haloacetic Acids (HAA5)	2	9.2.1.2 & 9.2.2.2.1.11 & 9.3.1.1 & subsection 9.2.1.2	3	12.6.1 to 12.6.5, 12.7.1 to 12.7.3, 13.0 to 13.6, 14.0 to 14.9
3. Bromate	2	9.2.1.2, subsection 9.2.1.2, 9.2.2.2.1.11 **Missing Fed Regs:** 141.62 (a)(2)	3	12.6.1 to 12.6.5, 12.7.1 to 12.7.3
4. Chlorite	2	9.2.1.2, subsection 9.2.1.2, 9.2.2.2.1.11 **Missing Fed Regs:** 141.62 (a)(2)	3	12.6.1 to 12.6.5, 12.7.1 to 12.7.3

G. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfection Residuals.13				
5. Chlorine(MRDL)	2	1.19.3.1	3	12.6.1 to 12.6.5, 12.8.1 (also references 7.0 and subsection 17.3.3, both don't exist)
6. Chloramine (MRDL)	2	1.19.3.1	3	12.6.1 to 12.6.5, 12.8.1 (also references 7.0 and subsection 17.3.3, both don't exist)
7. Chlorine dioxide (MRDL), where any two consecutive daily samples at entrance to the distribution system only are above MRDL	2	1.19.3.1, 12.14.2	2,3	12.6.1 to 12.6.5, 12.8.2, 12.14.2
8. Chlorine dioxide (MRDL), where sample(s) in distribution system the next day are also above MRDL	1	1.19.3.1, 12.14.2	1	12.6.1 to 12.6.5, 12.8.2, 12.14.2
9. Control of DBP precursors – TOC (TT)	2	12.16	3	12.6.1 to 12.6.5, 12.9
10. Bench marking and disinfection profiling	N/A	N/A	3	17.5
11. Development of monitoring plan	N/A	N/A	3	12.11

- In Del 14.4.1 (Federal 14.623(a)) requirement for >= 4.0 TOC and language is incorrect. This should read as: You may reduce monitoring to the level specified in the table in this paragraph any time the LRAA is ≤0.040 mg/L for TTHM and ≤0.030 mg/L for HAA5 at all monitoring locations. You may only use data collected under the provisions of this section 14 or section 12 of this part to qualify for reduced monitoring. In addition, the source water annual average TOC level, before any treatment, must be ≤4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either 12.7.1.3 or 12.9.
- In Del 12.2.1 Change Stage 1 MCL compliance determination date reference from 13.1.3 to 14.1.3
- In Del. 13.6.2 (Federal 141.605(b)(2)) Footnote 2 is not consistent with updated federal language.
- In Del. 14.2.1.2 (Federal 141.621(a)(2) Footnote 2 is not consistent with updated federal language.

Typographical Errors

- Section 2.0 Definitions: In the definition of SUVA, the units for UV should be changed from “cm□ 1” to “m□1” [p. 194].
- In Del. 13.6.3.7 (Federal 141.605(c)(7) need to change the reference from 13.4 to 12.7.1 and the reference from Section 13.0 to Section 14.0
- In Del. 12.1.2, change chlorine dioxide MRDL reference from 8.3 to 1.19.3
- In Del. 9.2.2.2 appears to be the original DBP rule. Remove if obsolete and remove cross reference located in 12.6.1 and 12.7.1.1.
- In Del. 12.8.1.1 cross reference to 17.3.3 does not exist and needs to change.
- In Del. 12.15.3, MRDLs not located at 12.5.3.1 and 12.5.3.2 and needs to change
- In Del 13.2.3.3 and 13.2.3.4, Cross reference to 15.0 should be changed to 14.0
- In Del. 13.6.3 reference to 13.0 should change to 14.0
- In Del 14.1.4.2, Cross reference to 13.6 is incorrect and needs to change.
- Section Del 4.4 does not exists. Update cross reference located in 14.10.2.
- There are numerous citations that reference subsection Del. 12.4. However, 12.4 does not exist; and therefore, these references must be corrected. Delaware citations that refer to 12.4 can be found at (with some suggested corrections noted below):

12.13.2 Update reference to 12.7.3
12.13.3 Update reference to 12.7.2
12.14.1.1 Update reference to 12.8.1.1 & 12.15
12.14.2.1 Update reference to 12.8.2
12.14.2.1 Update reference to 12.15
12.15.2 (each row in table)
12.15.3 (each row in table)

12.15.4 (each row in table)
12.16.1.2
12.16.1.2.3
12.16.1.3
12.16.1.3.2 Update reference to 12.2.2
13.1.1
13.1.4.1
13.1.5
13.2.1.1
13.2.3.1
13.3.1.1.1.1
13.3.1.1.1.2
13.3.1.1.2.1
13.3.1.2.2.4
13.3.1.2.2.6
13.3.2.1
13.4.1
13.4.1 table
13.4.1 footnote
13.4.2.1 Update reference to 12.7.1 13.5.1
13.5.2 Update reference to 12.7.1
13.6.2 table 13.6.3
13.6.3.3 Update reference to 12.7.1

Equivalency Questions

- In Del. 12.5 no minimum reporting level defined for DBP monitoring.
- (Not currently applicable) In Del 12.7.3.2.1 (Federal 141.132(b)(3)(ii)(A)) no timeline for return to routine monitoring included.
- Del 4.2.3.1 (Federal 141 Subpt Q Appendix B Endnote language 19/20) MCL determination language not listed, please confirm that this is listed in other Del. Regulation location.
- Del 4.2.3.1 (Federal 141 Subpt Q Appendix B Endnote language 21) MCL determination language not listed, please confirm that this is listed in other Del. Regulation location.
- Del 4.2.3.1 (Federal 141 Subpt Q Appendix B Endnote language 22/23) MRDL & MRDLG definition language not listed, please confirm that this is listed in other Del. Regulation location.
- Del 4.2.3.1 (Federal 141 Subpt Q Appendix B Endnote language 18) Federal schedule language not listed, please confirm that citations at 2.2, 12.2.1, 12.2.2 are equivalent.

Ground Water Rule

8.3.1.1.3 (Page 262), Typo. “I” should read “is”.
"The system is notified that a sample collected under subsection 7.4.7 ~~I~~ is total coliform-positive and the sample is not invalidated under subsection 7.4.3.3 beginning January 1, 2016."

8.3.1.2.4 (Page 263), Missing end of sentence.
"If the repeat sample collected from the ground water source is E. coli-positive…"

8.3.2 (Page 264), Should read “Division-determined” instead of “State-determined”.
"If directed by the Division, ground water systems must conduct assessment source water monitoring that meets ~~State~~ ***Division-determined*** *requirements”*

8.3.2.4 (Page 264), Typo. “In the in subsection” should read “in subsection”.
"Analysis of all ground water source samples using one of the analytical methods listed ***~~in the~~ in subsection*** *8.3.3.2 for the presence of E. coli, enterococci…”*

8.4.2.2.1 (Page 267), Capitalize “division”.
*"Notification to the Division must include engineering, operational, or other information that the ~~d~~**Division** requests to evaluate the submission."*

(Page 268), the subsection referenced 8.2.1 corresponds with 40 CFR 141.401(a). This should correspond with 40 CFR 141.74(a)(2).
"...continuously monitor the residual disinfectant concentration using analytical methods specified in subsection ***8.2.1****"*

(Page 268), the subsection referenced 8.2.1 corresponds with 40 CFR 141.401(a). This should correspond with 40 CFR 141.74(a)(2).
*"...continuously monitor the residual disinfectant concentration using analytical methods specified in subsection **8.2.1**"*

Lead and Copper Rule

Section Number	Comment and Suggested Changes
10.1.4.2	Change reference “under subsections 10.1.4 and 10.1.5” to“under subsections 10.2 and 10.3” [p. 291].

Section Number	Comment and Suggested Changes
10.2.1.2	Change "(serving <3,300 persons)" to "(serving =3,300 persons)" and "(serving >3,300 persons and <50,000 persons)" to "(serving >3,300 persons and =50,000 persons)" [p. 292].
10.2.2.3	Change reference "subsection 10.1.1.3" to "subsection 10.1.3.3" [p. 292].
10.2.2.3.4	Change phrase "paragraph, shall" to "paragraph, and shall" [p. 293].
10.2.4.1	In Step 2, enclose "subsection 10.3.3" in parenthesis [p. 293]. In Step 3, enclose "subsection 10.3.4" in parenthesis [p. 293]. In Step 4, enclose "subsection 10.3.5" in parenthesis [p. 293]. In Step 5, enclose "subsection 10.7.4.2 and subsection 10.8.3" in parenthesis [p. 293]. In Step 6, enclose "subsection 10.3.6" in parenthesis [p. 293]. In Step 7, enclose "subsection 10.3.7" and "subsection 10.7.4 and subsection 10.8.4" in parentheses [p. 293].
10.2.5.1.1	Add an end-of-parenthesis sign following "subsections 10.3, 10.7 and 10.8 [p. 293]. In Step 1, enclose "subsection 10.7.4.1 and subsection 10.8.2" in parenthesis in the first sentence. Enclose "subsection 10.3.1" in parenthesis in the second sentence [p. 293]. In Step 3, enclose "subsection 10.3.3" in parenthesis [p. 294]. In Step 4, enclose "subsection 10.3.4" in parenthesis [p. 294]. In Step 5, enclose "subsection 10.3.5" in parenthesis [p. 294]. In Step 6, enclose "subsection 10.7.4.2 and subsection 10.8.3" in parenthesis [p. 294]. In Step 7, enclose "subsection 10.3.6" in parenthesis [p. 294]. In Step 8, enclose "subsection 10.3.7" and "subsection 10.7.4.3 and subsection 10.8.4" in parentheses [p. 294].
10.2.5.1.2	In Step 3, enclose "subsection 10.3.3" in parenthesis [p. 294]. In Step 4, enclose "subsection 10.3.4" in parenthesis [p. 294]. In Step 5, enclose "subsection 10.3.5" in parenthesis [p. 294]. In Step 6, enclose "subsection 10.7.4.2 and subsection 10.8.3" in parenthesis [p. 294]. In Step 7, enclose "subsection 10.3.6" in parenthesis [p. 294]. In Step 8, enclose "subsection 10.3.7" and "subsection 10.7.4.3 and subsection 10.8.4" in parentheses [p. 294].
10.3.3.4	There are two subsections numbered as 10.3.3.4. The first subsection is correctly numbered. The second subsection 10.3.3.4 is incorrectly numbered; it should be numbered as 10.3.3.5 [p. 294].
10.3.3.5	This subsection is incorrectly numbered. It should be numbered as 10.3.3.6 [p. 294].

Section Number	Comment and Suggested Changes
10.3.8	This section needs a statement that indicates that the division's approval of a change in corrosion control treatment be in writing to correspond to the federal requirement in 40 CFR §141.82(h) [p. 296].
10.4.1	In Step 2, enclose "subsection 10.4.2.2" in parenthesis [p. 296]. In Step 3, enclose "subsection 10.4.2.3" in parenthesis [p. 296]. In Step 4, enclose "subsection 10.7.4.2" and "subsection 10.9.3" in parentheses [p. 296]. In Step 5, enclose "subsection 10.4.2.4" in parenthesis [p. 296]. In Step 6, enclose "subsection 10.4.2.4" and "subsection 10.9.4" in parentheses [p. 296].
10.5.1.1	This section is incorrectly numbered. Because there is no 40 CFR §141.84(b), there is no need for a corresponding State section 10.5.2. However, there is a 40 CFR §141.84(b)(1) which requires the corresponding State section to be numbered as 10.5.2.1 [p. 297].
10.5.1.2	This section is incorrectly numbered as described above. This section should be renumbered as 10.5.2.2 [p. 298].
10.6.2.2.6	Change the phrase "one of the categories' to "one or more of the categories" [p. 301].
10.6.2.5	Change the reference "subsection 10.6.2.2.5" to "subsection 10.6.2.4" in the second sentence [p. 301].
10.6.4.3	Change the reference "section 4.3.3.3" to "section 6.3.3" [p. 302].
10.7.1.2	Change the references to "section 7.2.4" in the first and second sentences to "section 11.1.4" in both sentences [p. 302].
10.7.2.6	Change the reference to "section 10.1.1" to "subsection 10.1.3.3" [p. 304].
10.7.3	In the "Number of Samples" table, change "<100" to "=100" in the "System Size" column [p. 305].
10.7.4.1	In the "Initial Tap Sampling" table, change "<3,300" to "=3,300" in the "System Size" column [p. 305].
10.7.4.4.5	Change both references to "subsection 10.1.1.3" to "subsection 10.1.3.3" [p. 307].
10.7.4.4.6.1	Change the reference "subsection 10.7.4.4.3" to "subsection 10.7.4.3" in the first sentence. Change the reference "subsection 10.7.4.3" to "subsection 10.7.4.4.3" in the last sentence [p. 307].
10.8.1.2.1	In the "Number of Samples" table, change "<100" to "=100" in the "System Size" column [p. 310].
10.8.5.1	In the "Number of Samples" table, change "<100" to "=100" in the "System Size" column [p. 311].
10.8.6	In footnote 1, change "illustrated" to "illustrative". In footnote 8, change the reference to "section 10.8" to "section 10.3.6" [p. 313].

Section Number	Comment and Suggested Changes
10.9.5.3	This section is missing from the reformatted regulations. It should be completed to correspond with the federal regulation in 40 CFR §141.88(e)(3) [p. 315].
10.10.1.1.2	Change the reference “subsection 10.7.2.6” to “subsection 10.7.6.2” [p. 315].
10.10.1.3	In the fourth sentence, change the phrase “switching coagulants (e.g., orthophosphate to blended phosphate)” to “switching coagulants (e.g., alum to ferric chloride), switching corrosion inhibitor products (e.g., alum to ferric chloride)” [p. 316].

FINDINGS OF FACT:

Minor technical changes were made to the proposed regulations based on the comments received. The Department finds that the proposed regulations, as set forth in the attached copy should be adopted in the best interest of the general public of the State of Delaware.

THEREFORE, IT IS ORDERED, that the proposed State of Delaware State of Delaware Regulations Governing Public Drinking Water Systems (4462) is adopted and shall become effective December 11, 2015, after publication of the final regulation in the Delaware *Register of Regulations*.

Rita M. Landgraf, Secretary
November 17, 2015

4462 Public Drinking Water Systems

~~**1.0 General Provisions**~~

~~1.1 "Application": These regulations shall apply to all public water systems in the State of Delaware.~~

~~1.2 "Variance": Variances will not be issued under these regulations.~~

~~1.3 "Exemption": Exemptions will not be issued under these regulations.~~

~~1.4-1.5 [Missing section numbers are reserved]~~

~~1.6 Right of Entry: The Director of the Division or his/her designee shall have the right of entry, during reasonable hours and in a reasonable manner and without fee or hindrance, for the purpose of conducting a sanitary survey and/or sampling of any public water supply and all water furnished by any public water supplier, whether or not the Division has evidence that the system is in violation of an applicable legal requirement.~~

~~1.7 Prohibiting Water Usage: The Division may prohibit the use of sources of water which after treatment do not provide water conforming to the standards established by these Regulations or which for any reason may pose a threat to the public's health.~~

~~1.8 Separability: If any provision of these Regulations is held invalid, such invalidity shall not affect other provisions which can be given effect without the invalid provision.~~

~~1.9 Enforcement of Regulations:~~

~~1.9.1 All PWSs must be operated in compliance with the requirements as set forth in these Regulations.~~

~~1.9.1.1 Notice: Whenever the Director of the Division, or his/her appointed representative, has reason to believe that a violation of any of these Regulations has occurred or is occurring; the Division shall notify the alleged violator. Such notice shall be in writing, may be sent by Certified Mail, or hand delivered, shall cite the Regulation or Regulations that are allegedly being violated, and shall state the facts which form the basis for believing that the violation has occurred or is occurring.~~

~~1.9.1.2 Orders: Notice of a violation may be accompanied by an order that requires that certain corrective action be taken. The order shall be signed by the Director or his/her designee or any of his/her appointed representatives and may require:~~

~~1.9.1.2.1 The immediate cessation or correction of the violation.~~

~~1.9.1.2.2 The acquisition or use of additional equipment, supplies or personnel to insure that the violation does not recur.~~

1.9.1.2.3 The submission of a plan to prevent future violations to the Division for review and approval.

1.9.1.2.4 Any other corrective action deemed necessary for proper compliance with the Regulations including interim remedies pending correction of violations.

1.9.1.3 Hearing Request: Any supplier of water who receives an order from the Division may submit a request for a hearing to the Secretary, Delaware Health and Social Services to contest the order.

1.9.1.4 Compliance with Effective Orders: Should any public water supplier fail to comply with any of these Regulations, the Secretary, Delaware Health and Social Services may apply to an appropriate court for an injunction or other legal process to prevent or stop any practice which is in violation of these regulations.

1.9.1.5 Penalties: The Secretary, Delaware Health and Social Services shall have the authority to impose an administrative penalty upon any public water system that refuses, fails or neglects to perform the duties required of it pursuant to Title 16, Chapter 1, §122(3)(C). The administrative penalty shall be as follows:

1.9.5.1.1 For systems serving a population of more than 10,000 people, not less than $1,000 nor more than $10,000 per day per violation; and

1.9.5.1.2 For any other system, the administrative penalty shall be not less than $100 or more than $10,000 per day per violation.

1.10 Emergency Orders: The Director of the Division or his/her appointed representative may issue emergency orders in any case where there is an imminent danger to the health of the public resulting from the operation of any waterworks or the source of a water supply. An emergency order may be communicated by the best practical notice under the circumstances, and is effective immediately upon receipt. The order may state any requirements necessary to remove the danger to the health of the public, including the immediate cessation of the operation of the PWS. Emergency orders shall be effective for a period not exceeding sixty (60) days at the determination of the Director of the Division or his/her representative. Should any public water supplier fail to comply with an emergency order, the Secretary, Delaware Health and Social Services may apply to an appropriate court for an injunction or other legal process to prevent or stop any practice which is in violation of these Regulations.

1.11 Plans and Specifications:

1.11.1 No person shall construct a new PWS or alter an existing PWS without a Certificate of Approval for Construction.

1.11.1.1 Systems shall submit two (2) copies of plans and specifications. Plans shall be developed using *Construction Plans and Specifications Submittal and Review Guidelines,* (Copies are available from the Office of Drinking Water), utilizing the latest edition of *Ten States Standards, NSF Standards, AWWA Standards,* or approved equivalent and other technical information as required by the Division.

1.11.1.2 Construction shall be in accordance with the approved plans and all conditions listed in the Certificate of Approval to Construct.

1.11.1.3 Whenever it is discovered that either of the above are occurring without such approval, the Director of the Division may order the owner, supplier of water or contractor to immediately stop the work and submit plans and specifications to the Division. After the submittal, any part of the system that has already been installed and is not in compliance shall be removed, altered or replaced in order to achieve compliance.

1.11.1.4 Plans and specifications shall be on paper no larger than 30" x 42". Within thirty (30) days of receipt of plans and specifications, the Division shall notify the person who submitted the plans and specifications if they have been approved or disapproved. Such notice shall specify any conditions of approval or any reasons for disapproval. Approvals are valid for one (1) year and construction shall begin within that time. All construction shall be in accordance with the approved plans and all conditions listed in the Certificate of Approval.

1.11.2 Effective October 1, 1999, all new community and non-transient non-community systems must comply with section 1.11.1, and, in addition, submit an Application for Capacity Development review. The application is available from the Office of Drinking Water.

1.12 Approval of Water Supplies:

1.12.1 No person shall operate a newly constructed public water system or renovated portion of an existing water system without a Certificate of Approval to Operate. A Certificate of Approval to Operate shall be issued by the Division to water systems which meet the following requirements:

1.12.1.1 Compliance with rules and regulations to prevent development of health hazards;

1.12.1.2 Adequate protection of the water quality throughout all parts of the system, as demonstrated by sanitary surveys;

1.12.1.3 Proper operation of the water supply system under the responsible charge of personnel whose qualifications meet the certification requirements of the Division;

1.12.1.4 Adequate capacity to meet anticipated peak demands while maintaining not less than twenty-five (25) pounds per square inch (psi) and not more than one hundred (100) psi at ground level at all points in the water distribution system and;

1.12.1.5 Records of laboratory examinations showing compliance with the water quality requirements of these Regulations.

1.12.1.5.1 Submission of as-built plans per the *Construction Plans and Specifications Submittal and Review Guidelines*, copies available from the Office of Drinking Water.

1.12.2 Effective October 1, 1999, in addition to the requirements in 2.12.1, approval of new community and non-transient non-community water systems shall be dependent upon the following:

1.12.2.1 A certification by a professional engineer that the system was built in accordance with approved plans and specifications and all conditions of the Certificate of Approval to Construct and.

1.12.2.2 Managerial and financial information as required by the Division to demonstrate compliance with Capacity as defined in section 1.1. This information may include, but not be limited to; annual reports, water system plans or business plans, self assessments/peer reviews, criteria used by lenders, financial viability assessment methods, financial and managerial training.

1.12.2.3 Failure to comply with 2.12.2.1 and 2.12.2.2 shall result in the Division denying the application for a Certificate of Approval to Operate. A new water system shall not commence operations without a Certificate of Approval to Operate.

1.13 Siting Requirements:

1.13.1 Before any person may enter into a financial commitment for or initiate construction of a new PWS or increase the capacity of an existing PWS, he shall notify the Division and, to the extent practicable, avoid locating part or all of the new or expanded facility at a site which:

1.13.1.1 Is subject to a significant risk from earthquakes, floods, fires or other disasters which could cause a breakdown of the PWS or a portion thereof or;

1.13.1.2 Except for intake structures, is within the floodplain of a one hundred (100) year flood or is lower than any recorded high tide where appropriate records exist.

1.14 Approved Laboratory:

1.14.1 For the purpose of determining compliance with subsections 1.12.1.15, 5.0, 6.0, 7.0, 8.0 and 9.0, samples may be considered only if they have been analyzed by the Division, EPA, or an approved laboratory, except that measurements for alkalinity, calcium, conductivity, disinfectant residual, orthophosphate, silica, turbidity, free chlorine residual, temperature and pH may be performed by any person acceptable to the Division.

1.14.2 Laboratory Certification Process: Continuation of laboratory certification for conducting drinking water analyses is contingent upon successful, on-going compliance with the most recent edition of the "Manual for the Certification of Laboratories Analyzing Drinking Water." Copies are available from the Office of Drinking Water.

1.14.3 Annual laboratory proficiency testing:

1.14.3.1 In order to demonstrate proficiency a laboratory shall successfully analyze a proficiency test (PT) from an approved provider annually using the same analytical method that is used to report compliance-monitoring results. In order to receive and maintain certification for an analyte, the laboratory shall successfully analyze PT samples using EPA-approved methods in accordance with 40CFR 141, copies are available from the Office of Drinking Water, for each analyte (microbiological and/or chemical) and by each method used to analyze compliance samples.

1.14.3.2 In order to receive annual certification, laboratories located in Delaware, shall complete a PT in the first quarter of the calendar year. Failure to complete the PT within the first quarter will result in the laboratory status being downgraded to "provisional". If a laboratory fails to get an acceptable result on a PT then they shall complete a make-up PT for those analytes that were unacceptable in the original PT within 60 days of the notification by the Division. Failure to successfully complete the make-up PT will result in the laboratories status being downgraded to "not certified."

1.14.3.3 In order for the Division to accept compliance results from laboratories located outside of Delaware, the laboratory must comply with the requirements of their home state. In addition, they must submit copies of their home state certification, copies of the last two PT's and a copy of their

Quality Assurance program prior to or at the time that compliance samples are submitted to the Division.

1.14.3.4 Annual certified analyte lists for in-state laboratories will be issued on July 1 of each year and expire on June 30 of the following year.

1.14.4 Reporting by laboratories: Laboratories that analyze compliance samples for public water systems in Delaware must report the results to the public water system in a timely manner and if a MCL or Action Level (AL) exceedance occurs then the Office of Drinking Water must be notified in accordance with the following:

1.14.4.1 Microbiological samples: If the original sample or one or more repeat samples are positive for fecal coliforms or *E. coli*, the laboratory must report the results by the end of the business day, or if it is after business hours, then by then end of the next business day

1.14.4.2 Chemical samples: If a sample exceeds a MCL or AL as specified in these regulations the laboratory must report the results by the end of the business day, or if it is after business hours, then by the end of the next business day.

1.14.5 Notification of major changes: Certified laboratories must notify the Division, in writing, within 30 days of major changes in personnel that impact who is conducting the analysis, new equipment, new methods being used, or laboratory re-location.

1.15 Quality. Drinking water shall not contain impurities in concentrations which may be hazardous to the health of the consumers. Substances used in its treatment shall not remain in the water in concentrations greater than required by good practice. Substances which may have deleterious physiological effects, or for which physiological effects are not known, shall not be introduced into the system in a manner which would permit them to reach the consumer. For the purpose of these regulations interim health-based standards shall be set by the Division on a case-by-case basis at a level between 10-4 to 10-6 risk level for those contaminants that are potential carcinogens and a Hazard Quotient of 1 to 10 for non-cancer health effects based on the best available science at the time. These standards shall be enforceable. For the purpose of these regulations Hazard Quotient shall mean expressions applied to modeled human health risk values associated with exposures to systemic, non-cancer causing contaminants.

1.16 Required Sampling, Monitoring or Analyses:

1.16.1 In any case where the Division does not perform sampling, monitoring or analyses required by these Regulations, the supplier of water shall be responsible for performing this sampling, monitoring or analyses.

1.16.2 Monitoring of consecutive public water systems: When a public water system supplies water to one or more other public water systems, the Division may modify the monitoring requirements imposed by these regulations to the extent that the interconnection of the systems justifies treating them as a single system for monitoring purposes. Any modified monitoring shall be conducted pursuant to a schedule specified by the Division and concurred with by the Administrator of the US Environmental Protection Agency.

1.17 Use of Bottled Water. Public water systems shall not use bottled water to achieve compliance with a MCL. Bottled water may be used on a temporary basis to avoid unreasonable risk to health.

1.18 These regulations shall become effective on December 10, 2005.

2.0 Definitions

The following definitions shall apply to these regulations:

"Action Level" means the concentration of lead or copper in water specified in subsections 6.1.7.1.1.1 and 6.1.7.1.1.2 which determines, in some cases, the treatment requirements contained in subsection 6.1.7 that a water system is required to complete.

"Alpha Particle" means a particle identical with a helium nucleus, emitted from the nucleus of a radioactive element.

"Approved" means approved by the Division.

"Bag Filters" means pressure-driven separation devices that remove particulate matter larger than 1 (one) micrometer using an engineered porous filtration media. They are typically constructed of a non-rigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to the outside.

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

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

"Beta Particle" means a particle identical with an electron, emitted from the nucleus of a radioactive element.

"Capacity" means the overall capability of a water system to reliably produce and deliver water meeting all national primary drinking water regulations. Capacity encompasses the technical, managerial, and financial capabilities that will enable a water system to plan for, achieve, and maintain compliance with applicable drinking water standards.

- Technical Capacity refers to the physical infrastructure of water system, including but not limited to, the adequacy of the source water, infrastructure (source, treatment, storage, and distribution), and the ability of system personnel to implement the requisite technical knowledge.
- Managerial Capacity refers to the management structure of the water system, including but not limited to ownership accountability, staffing and organization, and effective linkages.
- Financial Capacity refers to the financial resources of the water system, including but not limited to revenue sufficiency and fiscal controls.

"Cartridge Filters" mean pressure-driven separation devices that remove particulate matter larger than 1 (one) micrometer using an engineered porous filtration media. They are typically constructed as rigid or semi-rigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.

"Coagulation" means a process using coagulant chemicals and mixing by which colloidal and suspended materials are de-stabilized and agglomerated into flocs.

"Coliform Group" means all organisms considered in the coliform group as set forth in the current edition of Standard Methods for the Examination of Water and Waste Water prepared and published jointly by the American Public Health Association, American Water Works Association and Water Pollution Control Federation.

"Combined Distribution System" means the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

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

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

"Comprehensive Performance Evaluation (CPE)" means a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. The comprehensive performance evaluation must consist of at least the following components: Assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

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

"Consecutive Water Supply" means a public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems. This part shall apply to each public water system, unless the public water system meets all of the following conditions: a) Consists only of distribution and storage facilities (and does not have any collection and treatment facilities); b) Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply; c) Does not sell water to any person; and, d) Is not a carrier which conveys passengers in interstate commerce. The Division may opt to accept a consecutive supply as a single system for monitoring purposes.

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

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

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

"CT or CTcalc" means the product of the residual disinfectant concentration (C) in milligrams per liter (mg/L) determined before or at the first customer, and the corresponding disinfectant contact time (T) in minutes, i.e. "C" X "T". If a public water system applies disinfectants at more than one (1) point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or total inactivation ratio. In determining the total inactivation ratio, the public water system must determine the residual disinfectant concentration of each disinfection sequence and corresponding contact time before any subsequent disinfection application point(s). $CT_{99.9}$ is the CT value required for 99.9 percent (3-log) inactivation of *Giardia lamblia* cysts. The inactivation ratio is the CTcalc divided by the $CT_{99.9}$ and the total inactivation ratio is the sum of the inactivation ratios for each disinfection sequence. A total inactivation ratio equal to or greater than 1.0 is assumed to provide a 3-log inactivation of *Giardia lamblia* cysts.

"Diatomaceous Earth Filtration" means a process resulting in substantial particulate removal in which a precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum), and while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the feed water to maintain the permeability of the filter cake.

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

"Direct Responsible Charge" means accountability for and performance of active, daily, on-site operational duties.

"Disinfectant" means any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone added to water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogens (disease causing organisms).

"Disinfectant Contact Time (T)" means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration (C) is measured. Where only one (1) "C" is measured, "T" is the time in minutes that it takes for water to move from the point of disinfectant application to a point before or at where residual disinfectant concentration (C) is measured. Where more than one (1) "C" is measured, "T" is for the first measurement of "C", the time in minutes that it takes for water to move from the first or only point of disinfectant application to a point before or at the point where the first "C" is measured and for subsequent measurements of "C", the time in minutes that it takes for water to move from the previous "C" measurement point to the "C" measurement point for which the particular "T" is being calculated. Disinfectant contact time in pipelines must be calculated based on plug flow by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe. Disinfectant contact time within mixing basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.

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

"Disinfection Profile" means a summary of daily *Giardia lamblia* inactivation through the treatment plant. The procedure for developing a disinfection profile is contained in section 10.8 and in 40 CFR subparts P and T (Copies are available from the Office of Drinking Water).

"Division" means the Division of Public Health of the Department of Health and Social Services established by Title 29, section 7904 (a), **Delaware Code**.

"Domestic or Other Non-Distribution System Plumbing Problem" means a coliform contamination problem in a public water system with more than one (1) service connection that is limited to the specific service connection from which the coliform positive sample was taken.

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

"Dual Sample Set" means a set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an Initial Distribution System Evaluation (IDSE) under subsection 8.8 and determining compliance with the TTHM and HAA5 MCLs under subsection 8.8.

"Dwelling Unit" means one or more rooms arranged for the use of one or more individuals as a single housekeeping unit with cooking, living, sanitary and sleeping facilities.

"Effective Corrosion Inhibitor Residual" means a concentration sufficient to form a passivating film on the interior walls of a pipe.

"Emergency Situation" means a condition in which the specific provisions of these Regulations cannot be met for a temporary period and which necessitates immediate action because of the potential danger to public health.

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

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

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

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

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

"First Draw Sample" means a one (1) liter sample of tap water, collected in accordance with subsection 6.1.7.7.2.2, that has been standing in plumbing pipes at least six (6) hours and is collected without flushing the tap.

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

"Flowing Stream" means a course of running water flowing in a definite channel.

"GAC10" means granular activated carbon filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days, except that the reactivation frequency for GAC10 used as a best available technology for compliance with section 4.3 MCLs under subsection 4.3.6 shall be 120 days.

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

"Gross Alpha Particle Activity" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

"Gross Beta Particle Activity" means the total radioactivity due to beta particle emission as inferred from measurements on a dry sample.

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

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

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

"**Health Advisory (HA)**" means an estimate of acceptable drinking water levels for a chemical substance based on health effects information; a Health Advisory is not a legally enforceable Federal standard, but serves as technical guidance to assist Federal, State and local officials.

One-Day HA: The concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for up to one day of exposure. The One-Day HA is normally designed to protect a 10-kg child consuming 1 liter of water per day.

Ten-Day HA: The concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for up to ten days of exposure. The Ten-Day HA is also normally designed to protect a 10-kg child consuming 1 liter of water per day.

Lifetime HA: The concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for a lifetime of exposure. The Lifetime HA is based on exposure of a 70-kg adult consuming 2 liters of water per day. The Lifetime HA for Group C carcinogens includes an adjustment for possible carcinogenicity.

"Health Hazard" means any condition, device or practice in the water supply system or its operation which creates, or may create, a danger to the health and well-being of the water consumer.

"Initial Compliance Period" means the first full three-year compliance period which begins at least 18 months after promulgation, except for the following contaminants: Dichloromethane; 1,2,4-Trichlorobenzene; 1,1,2-Trichloroethane; Benzo[a]pyrene; Dalapon; Di(2-ethylhexyl adipate; Di(2-ethylhexyl) phthalate; Dinoseb; Diquat; Endothall; Endrin; Glyphosate; Hexachlorobenzene; Hexachlorocyclopentadiene; Oxamyl (Vydate); Picloram; Simazine; 2,3,7,8-TCDD (Dioxin); Antimony; Beryllium; Cyanide; Nickel; and Thallium, initial compliance period means the first full three-year compliance period after promulgation for systems with 150 or more service connections (January 1993 -December 1995) and first full three-year compliance period after the effective date of regulation (January 1996 - December 1998) for systems having fewer than 150 service connections.

"Lake/reservoir" means a natural or manmade basin or hollow on the Earth's surface in which water collects or is stored that may or may not have a current or single direction of flow.

"Large Water System" means a water system that serves more than 50,000 persons.

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

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

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

"Man-Made Beta Particle and Photon Emitters" means all radionuclides emitting beta particles and/or photons listed in Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air or Water for Occupational Exposure, NBS Handbook 69, except the daughter products of thorium 232, uranium 235 and uranium 238.

"Maximum Contaminant Level (MCL)" means the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

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

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

"Maximum Total Trihalomethane Potential (MTP)" means the maximum concentrations of total trihalomethanes produced in a given water containing a disinfectant residual after seven days at a temperature of 25^{o}C or above.

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

"Medium Size Water System" means a water system that serves greater than 3,300 and less than or equal to 50,000 persons.

"Minor Monitoring Violation" means the failure of a public water system to collect all required water samples or the failure to follow the prescribed sampling procedure within the prescribed time frame.

"Near the First Service Connection" means at one (1) of the twenty (20) percent of all service connections in the entire system that are nearest the water supply treatment facility, as measured by water transport time within the distribution system.

"Optimal Corrosion Control Treatment" means the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while insuring that the treatment does not cause the water system to violate any national primary drinking water regulations.

"Person" means any corporation, company, association, firm, municipally owned water utility, partnership, society and joint stock company, as well as any individual.

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

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

"Point of Disinfectant Application" means the point where the disinfectant is applied and water downstream of that point is not subject to recontamination by surface water runoff.

"Point of Entry Treatment Device" means a treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.

"Point of Use Treatment Device" means a treatment device applied to a single tap used for the purpose of reducing contaminants in the drinking water at that one (1) tap.

"Pollution" means the presence of anything in water which tends to degrade its quality so as to constitute a health hazard or impair the usefulness of the water.

"Potable Water" means water which is in compliance with all of the required drinking water standards specified in these Regulations, and is acceptable for human consumption.

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

"Primary Maximum Contaminant Level (PMCL)" means an MCL which involves a biological, chemical or physical characteristic of drinking water that may adversely affect the health of the consumer. This includes the MCLs for: coliform bacteria (includes total coliform and E. coli; antimony; arsenic; asbestos; barium; beryllium; cadmium; chromium; cyanide; fluoride; lead; mercury; nickel; nitrates; nitrites; total nitrate/nitrite selenium; thallium; turbidity; alachlor; atrazine; benzo(a)pyrene; carbofuran; chlordane; dalapon; di(2-ethylhexyl) adipate; di(2-ethylhexyl) phthalate; dibromochloropropane; dinoseb; diquat; 2,4-D; endothall; endrin; ethylenedibromide (EDB); glyphosate; heptachlor; heptachlor epoxide; hexachlorobenzene; hexachlorocyclopentadiene; lindane; methoxychlor; oxamyl (vydate); pentachlorophenol; picloram; polychlorinated biphenyls (PCBs); simazine; 2,3,7,8-TCDD (Dioxin); toxaphene; 2,4,5-TP silvex; total trihalomethanes; benzene; carbon tetrachloride; o-dichlorobenzene; p-dichlorobenzene; 1,2-dichloroethane, 1,1-dichloroetylene; cis-1,2-dichloroethylene; trans-1,2-dichloroethylene; dichloromethane; 1,2-dichlorpropane; ethylbenzene; monochlorobenzene; styrene; tetrachloroethylene; toluene; 1,2,4-trichlorobenzene; 1,1,1-trichloroethane; 1,1,2-trichloroethane; trichloroethylene; vinyl chloride; total xylenes and radioactivity (see section 9.0).

"Protection by Adequate Construction, Treatment and Supervision" means:

- Works which are of adequate capacity to meet the maximum demands without creating health hazards and which are located, designed and constructed to eliminate or prevent pollution.
- Any one or any combination of the controlled processes of coagulation, sedimentation, absorption, filtration, disinfection or other processes appropriate to the sources of supply, which produces water consistently meeting the requirements of these Regulations.
- Conscientious operation of a public water supply by an individual in direct responsible charge who is acceptable to the Division, and meets the certification requirements of the Division.

"Public Notice Tiers" means that public notice requirements are divided into three tiers to take into account the seriousness of the violation or situation and any potential adverse health effects that may be involved.

- Tier 1 public notice – required for National Primary Drinking Water (NPDWR) violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure.
- Tier 2 public notice – required for all other NPDWR violations and situations with potential to have serious adverse effects on human health.
- Tier 3 public notice – required for all other NPDWR violations and situations not included in Tier 1 and Tier 2.

"Public Water System (PWS)" means a water supply system for the provision to the public of water for human consumption through pipes or other constructed conveyances either directly from the user's free flowing outlet or indirectly by the water being used to manufacture ice, foods and beverages or that supplies water for potable or domestic purposes for consumption in more than three dwelling units, or furnishes water

for potable or domestic purposes to employees, tenants, members, guests or the public at large in commercial offices, industrial areas, multiple dwellings or semi-public buildings including, but without limitation, rooming and boarding houses, motels, tourist cabins, mobile home parks, restaurants, hospitals and other institutions, or offers any water for sale for potable domestic purposes. Public water systems are classified as follows:

- **"Community Water System (CWS)"** means a public water system which serves at least fifteen (15) service connections used by year-round residents or regularly serves at least twenty-five (25) year-round residents;
- **"Miscellaneous Public Water System (MPWS)"** means a public water system that is neither community, transient non-community nor non-transient non-community.
- **"Non-Transient Non-Community Water System (NTNCWS)"** means a public water system that is not a community water system and that regularly serves at least twenty-five (25) of the same persons over six (6) months per year;
- **"Transient Non-Community Water System (TNCWS)"** means a public water system which has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year;

"Radioactivity" means the spontaneous, uncontrollable disintegration of the nucleus of an atom with the emission of particles and rays.

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

"Repeat Compliance Period" means any subsequent compliance period after the initial compliance period.

"Residual Disinfectant Concentration (C)" means the concentration of disinfectant measured in mg/L in a representative sample of water. Disinfectant levels of <0.04 mg/L shall be considered non-detectable.

"Sanitary Survey" means a review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of: evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing potable drinking water; or updating the inventory information.

"Secondary Maximum Contaminant Level (SMCL)" means an MCL which involves a biological, chemical or physical characteristic of water that may adversely affect the taste, odor, color or appearance (aesthetics), which may thereby affect public confidence or acceptance of the drinking water. This includes the MCLs for aluminum, chloride, color, copper, corrosivity, foaming agents, iron, manganese, odor, pH, silver, sulfate, total dissolved solids and zinc.

"Secretary, Delaware Health and Social Services" means the agency defined in 29 **Del.C.** §7933.

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

"Service Connection" means a water line to a dwelling unit or building.

"Service Line Sample" means a one (1) liter sample of water collected in accordance with subsection 6.1.7.7.2.3 that has been standing for at least six (6) hours in a service line.

"Single Family Structure" means a building constructed as a single family residence that is currently used as either a residence or a place of business.

"Slow Sand Filtration" means a process involving passage of raw water through a bed of sand at low velocity (generally less than 0.4 meters per hour) resulting in substantial particulate removal by physical and biological mechanisms.

"Small Water System" means a water system that served 3,300 persons or fewer.

"Source" means the place from which a system obtains its water. This may be either from underground or from the surface. Surface water may include rivers, lakes, reservoirs, springs, impoundments or a body of water with a surface exposed to the atmosphere.

"Standard Sample" means the sample size for bacteriological testing and shall consist of:

- For the fermentation tube test, five (5) standard portions of either twenty (20) milliliters (ml) or one hundred (100) ml.
- For the membrane filter technique, not less than one hundred (100) ml.

"Subpart H Systems" means public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to the filtration and disinfection requirements of these regulations.

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

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

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

"System with a Single Service Connection" means a system which supplies drinking water to consumers via a single service line.

"Too Numerous to Count" means that the total number of bacterial colonies exceeds two hundred (200) on a forty-seven (47) millimeter (mm) diameter membrane filter used for coliform detection.

"Total Coliform-Positive Sample" means any Presence-Absence (P-A) Coliform Test with a result of present (P), any Minimal Medium ONPG-MUG (MMO-MUG) Test with a result of P, any Membrane Filter Technique test with a result of one (1) or more colonies per one hundred (100) ml, or any Multiple Tube Fermentation test with a result of one (1) or more positive tubes.

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

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

"Treatment Technique Requirement" means a requirement which specifies for a contaminant a specific treatment technique(s) demonstrated to the satisfaction of the Division to lead to a reduction in the level of such contamination sufficient to comply with these Regulations.

"Trihalomethanes (THMs)" means one of the family of organic compounds, named as derivatives of methane, wherein three (3) of the four (4) hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

"Turbidity" means a measure of the clarity or cloudiness of water in Nephelometric Turbidity Units (NTUs).

"Two-stage Lime Softening" means a process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes in series prior to filtration.

"Uncovered Finished Water Storage Facility" means a tank, reservoir, or other facility used to store water that will undergo no further treatment to reduce microbial pathogens except residual disinfection and is open to the atmosphere. Finished water storage facilities that are properly covered, screened and vented are excluded from this definition.

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

"Vulnerable" means subject to contamination, a determination which shall be made by the Division based on previous monitoring results, the number of persons served by the public water system, the proximity of a smaller system to a larger system, the proximity to commercial or industrial use, disposal or storage of volatile synthetic organic compounds (VOCs), and the protection of the water source(s).

"Waterborne Disease Outbreak" means the significant occurrence of an acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment, as determined by the Division.

"Water Distribution System" means the pumps, piping and storage facilities from the source(s)/treatment plant to the property line of the ultimate consumer.

"Water Supply System" means the structures, equipment and appurtenances for collection, treatment, storage and distribution of potable water from the source of supply to the free-flowing outlet of the ultimate consumer.

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

17 DE Reg. 439 (10/01/13)

3.0 Source and Protection

3.1 Water Source Desirability. Drinking water shall be obtained from the most desirable source which is feasible, and efforts must be made to prevent or control pollution of the source. If the source fails to meet the bacteriological standards of section 5.0 and is not already disinfecting pursuant to subsection 8.2, it may be required to do so in order to meet the bacteriological standards.

3.2 Sanitary Surveys: Sanitary surveys shall be made by the Division in order to locate and identify health hazards which might exist in the water supply system. The manner and frequency of making these surveys, and the

rate at which discovered health hazards are to be removed, shall be in accordance with a program approved by the Division.

3.2.1 Water systems must correct any major sanitary defects noted during a sanitary survey as soon as possible but no later than 30 days after being notified by the Division. If the corrections will take longer than 30 days to complete then a corrective action plan with a timetable must be submitted to the Office of Drinking Water.

3.2.2 Public water systems which do not collect five or more routine samples per month must undergo an initial sanitary survey by June 29, 1994, for community water systems and June 29, 1999, for non-community water systems. Thereafter, systems must undergo another sanitary survey every five years, except that non-community water systems using only protected and disinfected ground water, as defined by the Division, must undergo subsequent sanitary surveys at least every ten years after the initial sanitary survey. The Division must review the results of each sanitary survey to determine whether the existing monitoring frequency is adequate and what additional measures, if any, the system needs to undertake to improve drinking water quality.

3.2.3 In conducting a sanitary survey of a system using ground water in a State having an EPA-approved wellhead protection program under section 1428 of the Safe Drinking Water Act, information on sources of contamination within the delineated wellhead protection area that was collected in the course of developing and implementing the program should be considered instead of collecting new information, if the information was collected since the last time the system was subject to a sanitary survey.

3.2.4 Sanitary surveys must be performed by the Division or an agent approved by the Division. The system is responsible for ensuring the survey takes place.

3.2.5 Sanitary surveys conducted by the Division under provisions of subsection 5.4.2.3 may be used to meet the sanitary survey requirements of this section.

3.3 Protection of Water. Water delivered to every consumer by any public water supplier shall be so protected by natural means, by proper constructions or by treatment so as to consistently equal or exceed the requirements herein established.

3.4 Monitoring Water Quality. Quality of water delivered by any public water supplier shall be continuously and/or periodically monitored in accordance with requirements herein established or in accordance with such monitoring plan of equal or greater effect as may be proposed by a public water supplier for its own use, subject to Division approval.

3.5 Responsibility. For the purpose of application of these Regulations, the supplier of water shall be responsible for the water quality at the user's free flowing outlet except for turbidity, inorganic compounds, radionuclides, SOCs, and VOCs, which are measured at a representative entry point(s) to the water distribution system.

3.6 Certified Operator. A water supply system shall be operated under the direct responsible charge of personnel whose qualifications meet the certification requirements of the “State of Delaware Regulations for the Licensing and Registration of Operators of Public Water Supply Systems.”

3.7 Approved Sampler/Tester:

3.7.1 An approved sampler/tester is approved for conducting routine water sampling and water quality analyses for chlorine residual, pH, nitrate testing or water quality parameter testing and entering that information into a log book. The approved sampler/tester is not a fully licensed operator and must work under the direction of a licensed operator. The approved sampler/tester must attend an approved course and pass a test approved by the Division. Individuals collecting samples under the tap water monitoring provisions of the lead/copper rule are exempted from this requirement.

3.7.2 Approved sampler/tester certification shall be valid for three years. An individual must attend a class approved by the Division and pass a test in order to receive certification. Attendance at an approved class and passing the test is required for renewal of the certification.

3.8 The requirements of this section shall become effective January 1, 2006.

4.0 Reporting, Public Notification, Consumer Confidence Reports and Record Maintenance

4.1 Reporting

4.1.1 Results of Test, Measurement or Analysis: Except where a shorter period is specified in this part, the supplier of water shall report to the Division the results of any test, measurement or analysis required by this part within:

4.1.1.1 The first ten (10) days following the month in which the result is received, or

4.1.1.2 The first ten (10) days following the end of the required monitoring period as stipulated by the Division, whichever of these is shortest.

4.1.1.3 Daily testing for free available chlorine residual, nitrates, pH, fluoride or other chemicals as determined by the Division is required for systems that provide treatment (addition, removal or adjustment) unless another schedule is agreed to in writing by the Division.

4.1.2 Failure to Comply with a PMCL: Unless otherwise stipulated, the supplier of water shall report to the Division within twenty-four (24) hours the failure to comply with any Primary Drinking Water Regulations (including failure to comply with monitoring requirements).

4.1.3 Analysis Performed by Division of Public Health Laboratory: The supplier of water is not required to report analytical results to the Division in cases where an approved laboratory performs the analyses and reports the results directly to the Division.

4.1.4 Reporting of Unregulated Contaminants: The owner of a CWS or NTNCWS who is required to monitor under 40 CFR 141.40, shall send a copy of the results of such monitoring to the Division within thirty (30) days of receipt and any public notice issued under subsection 4.2.6 to the Division.

4.1.5 Reporting by Surface Water Systems: A PWS that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment must report monthly to the Division the information specified in this paragraph, beginning June 29, 1993.

4.1.5.1 Turbidity measurements must be reported within ten (10) days after the end of each month the system serves water to the public. Information that must be reported includes:

4.1.5.1.1 The total number of filtered water turbidity measurements taken during the month.

4.1.5.1.2 The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits for the filtration technology being used.

4.1.5.1.3 The date and value of any turbidity measurements taken during the month which exceed one (1) NTU.

4.1.5.2 Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, must report that occurrence to the Division as soon as possible, but no later than by the end of the next business day. If at any time the turbidity exceeds one (1) NTU, the system must inform the Division as soon as possible, but no later than the end of the next business day. If at any time the free available chlorine residual falls below 0.3 mg/L in the water entering the distribution system, the system must notify the Division as soon as possible, but no later than by the end of the next business day. The system must also notify the Division by the end of the next business day whether or not the free available chlorine residual was restored to at least 0.3 mg/L within four (4) hours.

4.1.6 Reporting of Chemical Overfeed Incidents or Unusual Events: It is the responsibility of the owner and/or the operator of a Public Water System to report to the Division, within 24 hours, any incidents of chemical overfeed and/or unusual events.

4.1.6.1 Examples of unusual events include but are not limited to the following:

- Loss of pressure
- Well pump failure
- Main break with associated loss of pressure
- Loss of disinfectant or other treatment failure
- Acts of vandalism
- Discovery of malicious intent

4.1.7 Certification requirements: The public water system, within 10 days of completing the public notification requirements under subsection 4.2 of these regulations for the initial public notice and any repeat notices, must submit to the Division a certification that it has fully complied with the public notification requirements. The public water system must include with this certification a representative copy of each type of notice distributed, published, posted and made available to the persons served by the system and to the media.

4.1.8 Submission to the Division: The water supply system shall submit to the Division within the time stated in the request copies of any records required to be maintained under subsection 4.4 hereof or copies of any documents then in existence that the Division or the Administrator of the US Environmental Protection Agency is entitled to inspect pursuant to the authority of section 1445 of the Safe drinking Water Act or the equivalent provisions of the Delaware Code.

4.1.9 General Requirements

4.1.9.1 Each owner or operator of a public water system (community water systems, non-transient non-community water systems, and transient non-community water systems) must give notice for all violations of national primary drinking water regulations (NPDWR) and for other situations, as listed in subsection 4.1.9.1.1. The term "NPDWR violations" is used in this subpart to include violations of the maximum contaminant level (MCL), maximum residual disinfection level (MRDL),

~~treatment technique (TT), monitoring requirements, and testing procedures in this part 141. Appendix A to this subpart identifies the tier assignment for each specific violation or situation requiring a public notice.~~

~~4.1.9.1.1 Violation categories and other situations requiring a public notice.~~

~~4.1.9.1.1.1 NPDWR violations:~~

~~4.1.9.1.1.1.1 Failure to comply with an applicable maximum contaminant level (MCL) or maximum residual disinfectant level (MRDL).~~

~~4.1.9.1.1.1.2 Failure to comply with a prescribed treatment technique (TT).~~

~~4.1.9.1.1.1.3 Failure to perform water quality monitoring, as required by the drinking water regulations.~~

~~4.1.9.1.1.1.4 Failure to comply with testing procedures as prescribed by a drinking water regulation.~~

~~4.1.9.1.1.2 Special public notices:~~

~~4.1.9.1.1.2.1 Occurrence of a waterborne disease outbreak or other waterborne emergency.~~

~~4.1.9.1.1.2.2 Exceedance of the nitrate MCL by non-community water systems (NCWS), where granted permission by the primacy agency under subsection 6.1.2.11.~~

~~4.1.9.1.1.2.3 Availability of unregulated contaminant monitoring data.~~

~~4.1.9.1.1.2.4 Other violations and situations determined by the primacy agency to require a public notice not already listed in subsection 4.2.3.~~

~~4.1.9.2 Public notice requirements are divided into three tiers, to take into account the seriousness of the violation or situation and of any potential adverse health effects that may be involved. The public notice requirements for each violation or situation listed in subsection 4.1.9.1.1 are determined by the tier to which it is assigned. Section 1.0 provides the definition of each tier. Subsection 4.2.3 identifies the tier assignment for each specific violation or situation.~~

~~4.1.9.3 Each public water system must provide public notice to persons served by the water system, in accordance with this section.~~

~~4.1.9.3.1 Public water systems that sell or otherwise provide drinking water to other public water systems (*i.e.*, to consecutive systems) are required to give public notice to the owner or operator of the consecutive system; the consecutive system is responsible for providing public notice to the persons it serves.~~

~~4.1.9.3.2 If a public water system has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, the primacy agency may allow the system to limit distribution of the public notice to only persons served by that portion of the system which is out of compliance. Permission by the primacy agency for limiting distribution of the notice must be granted in writing.~~

~~4.1.9.3.3 A copy of the notice must also be sent to the primacy agency, in accordance with the requirements under subsection 4.2.1.1.4.~~

~~4.2 Public Notification~~

~~4.2.1 General Public Notice Requirements:~~

~~4.2.1.1 It shall be the duty and responsibility of a water supply owner to give public notice in accordance with the following requirements:~~

~~4.2.1.1.1 Tier 1 Public Notice: Form, manner, and frequency of notice.~~

~~4.2.1.1.1.1 Violation categories and other situations requiring a Tier 1 public notice. Subsection 4.2.3 identifies the tier assignment for each specific violation or situation.~~

~~4.2.1.1.1.1.1 Violation of the MCL for total coliforms when fecal coliform or *E. coli* are present in the water distribution system (as specified in section 5.2), or when the water system fails to test for fecal coliforms or *E. coli* when any repeat sample tests positive for coliform (as specified in subsection 5.2);~~

~~4.2.1.1.1.1.2 Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, as defined in section 6.1, or when the water system fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate or nitrite MCL, as specified in subsection 6.1.2 or violation of the fluoride MCL as defined in subsection 6.1.3;~~

~~4.2.1.1.1.1.3 Exceedance of the nitrate MCL by non-community water systems, where permitted to exceed the MCL by the Division under subsection 6.1.2.11;~~

4.2.1.1.1.1.4 Violation of the MRDL for chlorine dioxide, as defined in subsection 8.3.1, when one or more samples taken in the distribution system the day following an exceedance of the MRDL at the entrance of the distribution system exceed the MRDL, or when the water system does not take the required samples in the distribution system, as specified in subsection 8.4.7;

4.2.1.1.1.1.5 Violation of the turbidity MCL under subsection 7.1.1, where the Division determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;

4.2.1.1.1.1.6 Violation of the Surface Water Treatment Rule (SWTR)(Section 10.0), Interim Enhanced Surface Water Treatment Rule (IESWTR) (subsection 10.7) or the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) (subsection 10.13) treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit (as identified in subsection 4.2.3), where the Division determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;

4.2.1.1.1.1.7 Occurrence of a waterborne disease outbreak, as defined in Section 1.0, or other waterborne emergency (such as a failure or significant interruption in key water treatment processes, a natural disaster that disrupts the water supply or distribution system, or a chemical spill or unexpected loading of possible pathogens into the source water that significantly increases the potential for drinking water contamination);

4.2.1.1.1.1.8 Detection of E. coli, enterococci, or coliphage in source water samples as specified in subsections 5.4.3.1 and 5.4.3.2;

4.2.1.1.1.1.9 Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the Division either in these regulations or on a case-by-case basis.

4.2.1.1.1.2 Public water systems must:

4.2.1.1.1.2.1 Provide a public notice as soon as practical but no later than 24 hours after the system learns of the violation;

4.2.1.1.1.2.2 Initiate consultation with the Division as soon as practical, but no later than 24 hours after the public water system learns of the violation or situation, to determine additional public notice requirements; and

4.2.1.1.1.2.3 Comply with any additional public notification requirements (including any repeat notices or direction on the duration of the posted notices) that are established as a result of the consultation with the Division. Such requirements may include the timing, form, manner, frequency, and content of repeat notices (if any) and other actions designed to reach all persons served.

4.2.1.1.1.3 Public water systems must provide the notice within 24 hours in a form and manner reasonably calculated to reach all persons served. The form and manner used by the public water system are to fit the specific situation, but must be designed to reach residential, transient, and non-transient users of the water system. In order to reach all persons served, water systems are to use, at a minimum, one or more of the following forms of delivery:

4.2.1.1.1.3.1 Appropriate broadcast media (such as radio and television);

4.2.1.1.1.3.2 Posting of the notice in conspicuous locations throughout the area served by the water system;

4.2.1.1.1.3.3 Hand delivery of the notice to persons served by the water system; or

4.2.1.1.1.3.4 Another delivery method approved in writing by the Division.

4.2.1.1.2 Tier 2 Public Notice: Form, manner and frequency of notice

4.2.1.1.2.1 Violation categories and other situations requiring a Tier 2 public notice. Subsection 4.2.3 identifies the tier assignment for each specific violation or situation.

4.2.1.1.2.1.1 All violations of the MCL, MRDL, and Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR), the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), Lead and Copper Rule (LCR), Disinfectant/ Disinfection Byproduct Rules (DBPRs), and the Ground Water Rule (GWR) treatment technique requirements, except where a Tier 1 notice is required under subsection 4.1.1.1 or where the Division determines that a Tier 1 notice is required;

4.2.1.1.2.1.2 Violations of the monitoring and testing procedure requirements, where the Division determines that a Tier 2 rather than a Tier 3 public notice is required, taking into account potential health impacts and persistence of the violation;

4.2.1.1.2.1.3 Special notice for repeated failure to conduct monitoring of the source water for *Cryptosporidium* and for failure to determine bin classification or mean *Cryptosporidium* level.

4.2.1.1.2.1.3.1 The owner or operator of a community or non-community water system that is required to monitor source water under subsection 10.14.2 must notify persons served by the water system that monitoring has not been completed as specified no later than 30 days after the system has failed to collect any 3 months of monitoring as specified in subsection 10.14.2.3. The notice must be repeated as specified in 4.2.1.1.2.2.1.

4.2.1.1.2.1.3.2 The owner or operator of a community or non-community water system that is required to determine a bin classification under subsection 10.14.11, or to determine mean *Cryptosporidium* level under subsection 10.14.13, must notify persons served by the water system that the determination has not been made as required no later than 30 days after the system has failed to report the determination as specified in subsection 10.14.11.5 or subsection 10.14.13.1, respectively. The notice must be repeated as specified in 4.2.1.1.2.2.1. The notice is not required if the system is complying with a State-approved schedule to address the violation.

4.2.1.1.2.1.3.3 The form and manner of the public notice must follow the requirements for a Tier 2 public notice prescribed in subsection 4.2.1.1.2. The public notice must be presented as required in subsection 4.2.2.3.1.

4.2.1.1.2.1.3.4 The notice must contain the following language, including the language necessary to fill in the blanks.

4.2.1.1.2.1.3.3.1 The special notice for repeated failure to conduct monitoring must contain the following language:

We are required to monitor the source of your drinking water for *Cryptosporidium*. Results of the monitoring are to be used to determine whether water treatment at the (treatment plant name) is sufficient to adequately remove *Cryptosporidium* from your drinking water. We are required to complete this monitoring and make this determination by (required bin determination date). We ``did not monitor or test'' or ``did not complete all monitoring or testing'' on schedule and, therefore, we may not be able to determine by the required date what treatment modifications, if any, must be made to ensure adequate *Cryptosporidium* removal. Missing this deadline may, in turn, jeopardize our ability to have the required treatment modifications, if any, completed by the deadline required, (date).

For more information, please call (name of water system contact) of (name of water system) at (phone number).

4.2.1.1.2.1.3.3.2 The special notice for failure to determine bin classification or mean *Cryptosporidium* level must contain the following language:

We are required to monitor the source of your drinking water for *Cryptosporidium* in order to determine by (date) whether water treatment at the (treatment plant name) is sufficient to adequately remove *Cryptosporidium* from your drinking water. We have not made this determination by the required date. Our failure to do this may jeopardize our ability to have the required treatment modifications, if any, completed by the required deadline of (date). For more information, please call (name of water system contact) of (name of water system) at (phone number).

4.2.1.1.2.1.3.3.3 Each special notice must also include a description of what the system is doing to correct the violation and when the system expects to return to compliance or resolve the situation.

4.2.1.1.2.1.4 Failure to take corrective action or failure to maintain at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer under subsection 5.4.4.1.

4.2.1.1.2.1.5 Other violations or situations with significant potential to have adverse effects on human health as a result of exposure, as determined by the Division either in these regulations or on a case-by-case basis.

4.2.1.1.2.2 Public water systems must:

4.2.1.1.2.2.1 Public water systems must provide the public notice as soon as practical, but no later than 14 days after the system learns of the violation. If the public notice is posted, the notice must remain in place for as long as the violation or situation persists, but in no case for less than seven days, even if the violation or situation is resolved.

4.2.1.1.2.2.2 The public water system must repeat the notice every three months as long as the violation or situation persists, unless the Division determines that appropriate circumstances warrant a different repeat notice frequency. In no circumstance may the repeat notice be given less frequently than once per year. It is not appropriate for the Division to allow less frequent repeat notice for an MCL violation under the Total Coliform Rule or a treatment technique violation under the Surface Water Rule or Interim Enhanced Surface Water Treatment rule. It is also not appropriate for the Division to allow through its rules or its policies across-the-board reductions in the repeat notice frequency for other ongoing violation requiring a Tier 2 repeat notice. Division determinations allowing repeat notices to be given less frequently than once every three months must be in writing.

4.2.1.1.2.2.3 For the turbidity violations specified in this paragraph, public water systems must consult with the Division as soon as practical but no later than 24 hours after the public water system learns of the violation, to determine whether a Tier 1 public notice under subsection 4.1.1.1 is required to protect public health. When consultation does not take place within the 24-hour period, the water system must distribute a Tier 1 notice of the violation within the next 24 hours (i.e., no later than 48 hours after the system learns of the violation), following the requirements under subsections 4.1.1.2 and 4.1.1.3. Consultation with the Division is required for:

4.2.1.1.2.2.3.1 Violation of the turbidity MCL under subsection 7.1.1; or

4.2.1.1.2.2.3.2 Violation of the SWTR, IESWTR or LT1ESWTR treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit.

4.2.1.1.2.2.3.3 Public water systems must provide the initial public notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

4.2.1.1.2.2.3.3.1 Unless directed otherwise by the Division in writing, community water systems must provide notice by:

4.2.1.1.2.2.3.3.1.1 Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

4.2.1.1.2.2.3.3.1.2 Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in subsection 4.2.1.3.1.1. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: Publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places served by the system or on the Internet; or delivery to community organizations.

4.2.1.1.2.2.3.3.2 Unless directed otherwise by the Division in writing, non-community water systems must provide notice by:

4.2.1.1.2.2.3.3.2.1 Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

4.2.1.1.2.2.3.3.2.2 Any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice required in subsection 4.2.1.1.3.2.1. Such persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. Other methods may include: Publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (e.g., community centers).

4.2.1.1.3 Tier 3 Public Notice: Form, manner, and frequency of notice

4.2.1.1.3.1 Violation categories and other situations requiring a Tier 3 public notice. Subsection 4.2.3 identifies the tier assignment for each specific violation or situation.

4.2.1.1.3.1.1 Monitoring violations under 40 CFR part 141, except where a Tier 1 notice is required under subsection 4.2.1.1 or where the Division determines that a Tier 2 notice is required;

4.2.1.1.3.1.2 Failure to comply with a testing procedure established in 40 CFR part 141, except where a Tier 1 notice is required under subsection 4.2.1.1 or where the Division determines that a Tier 2 notice is required;

4.2.1.1.3.1.3 Failure to comply with section 3.6 of these regulations;

4.2.1.1.3.1.4 Availability of unregulated contaminant monitoring results, as required under subsection 4.2.6; and

4.2.1.1.3.1.5 Other violations or situations with significant potential to have adverse effects on human health as a result of exposure, as determined by the Division either in these regulations or on a case-by-case basis.

4.2.1.1.3.2 Public water systems must:

4.2.1.1.3.2.1 Public water systems must provide the public notice not later than 90 days after the public water system learns of the violation or situation. Following the initial notice, the public water system must repeat the notice annually for as long as the violation or other situation persists. If the public notice is posted, the notice must remain in place for as long as the violation or other situation persists, but in no case less than seven days (even if the violation or situation is resolved).

4.2.1.1.3.3 Public water systems must provide the initial notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

4.2.1.1.3.3.1 Unless directed otherwise by the Division in writing, community water systems must provide notice by:

4.2.1.1.3.3.1.1 Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

4.2.1.1.3.3.1.2 Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in subsection 4.2.1.1.3.1.1. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: Publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places or on the Internet; or delivery to community organizations.

4.2.1.1.3.3.2 Unless directed otherwise by the Division in writing, non-community water systems must provide notice by:

4.2.1.1.3.3.2.1 Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

4.2.1.1.3.3.2.2 Any other method reasonably calculated to reach other persons served by the system, if they would not normally be reached by the notice required in subsection 4.2.1.1.3.3.2.1. Such persons may include those who may not see a posted notice because the notice is not in a location they routinely pass by. Other methods may include: Publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (e.g., community centers).

4.2.1.1.4 Certification to the Division: The owner of a public water system, within ten (10) days of completing the public notice requirements of this section for the initial public notice and any repeat notices, shall submit to the Division a completed Delivery Certification Form, certifying when and how the public notice was delivered and that they have complied with the public notice regulations. The owner shall include with this certification a copy, as delivered, of each type of notice distributed, published, posted, and made available to the persons served by the system and to the media.

4.2.1.1.5 The Division may, at their discretion, 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.

4.2.2 Content of a Public Notice

4.2.2.1 When a public water system violates a NPDWR or has a situation requiring public notification, each public notice must include the following elements:

4.2.2.1.1 A description of the violation or situation, including the contaminant(s) of concern, and (as applicable) the contaminant level(s);

4.2.2.1.2 When the violation or situation occurred;

4.2.2.1.3 Any potential adverse health effects from the violation or situation, including the standard language under subsections 4.2.2.4.1 or 4.2.2.4.2, whichever is applicable;

4.2.2.1.4 The population at risk, including subpopulations particularly vulnerable if exposed to the contaminant in their drinking water;

4.2.2.1.5 Whether alternative water supplies should be used;

4.2.2.1.6 What actions consumers should take, including when they should seek medical help, if known;

4.2.2.1.7 What the system is doing to correct the violation or situation;

4.2.2.1.8 When the water system expects to return to compliance or resolve the situation;

4.2.2.1.9 The name, business address, and phone number of the water system owner, operator, or designee of the public water system as a source of additional information concerning the notice; and

4.2.2.1.10 A statement to encourage the notice recipient to distribute the public notice to other persons served, using the standard language under subsection 4.2.2.4.3, where applicable.

4.2.2.2 The public notice shall:

4.2.2.2.1 Each public notice required by this section:

4.2.2.2.1.1 Must be displayed in a conspicuous way when printed or posted;

4.2.2.2.1.2 Must not contain overly technical language or very small print;

4.2.2.2.1.3 Must not be formatted in a way that defeats the purpose of the notice;

4.2.2.2.1.4 Must not contain language which nullifies the purpose of the notice.

4.2.2.2.2 Each public notice required by this section must comply with multilingual requirements, as follows:

4.2.2.2.2.1 For public water systems serving a large proportion of non-English speaking consumers, as determined by the Division, the public notice must contain information in the appropriate language(s) regarding the importance of the notice or contain a telephone number or address where persons served may contact the water system to obtain a translated copy of the notice or to request assistance in the appropriate language.

4.2.2.2.2.2 In cases where the Division has not determined what constitutes a large proportion of non-English speaking consumers, the public water system must include in the public notice the same information as in subsection 4.2.2.2.2.1, where appropriate to reach a large proportion of non-English speaking persons served by the water system.

4.2.2.3 Public water systems are required to include the following standard language in their public notice:

4.2.2.3.1 Standard health effects language for MCL or MRDL violations, and treatment technique violations. Public water systems must include in each public notice the health effects language specified in subsection 4.2.2.5 corresponding to each MCL, MRDL, and treatment technique violation listed in subsection 4.2.2.

4.2.2.3.2 Standard language for monitoring and testing procedure violations. Public water systems must include the following language in their notice, including the language necessary to fill in the blanks, for all monitoring and testing procedure violations listed in subsection 4.2.2:

"We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During [compliance period], we "did not monitor or test" or "did not complete all monitoring or testing" for [contaminant(s)], and therefore cannot be sure of the quality of your drinking water during that time."

4.2.2.3.3 Standard language to encourage the distribution of the public notice to all persons served. Public water systems must include in their notice the following language (where applicable):

"Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail."

4.2.2.4 Mandatory Health Effects Language:

4.2.2.4.1 When providing the information on potential adverse health effects required by subsection 4.2.2.3.1 in notices of violations of MCLs or treatment technique requirements the owner of a PWS must include the following mandatory language specific to each contaminant:

4.2.2.4.1.1 Microbiological Contaminants:

Total Coliforms: Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.

Fecal Coliforms/*E. coli*: Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly and people with severely compromised immune systems.

Fecal indicators (enterococci or coliphage): Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

Total organic carbon (TOC): 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.

Turbidity: 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.

Giardia lamblia, Viruses, Heterotrophic plate count (HPC) bacteria, Legionella, and *Cryptosporidium*: 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. The language in this paragraph shall be used for any violation of the following rules: the Surface Water Treatment Rule; The Interim Enhanced Surface Water Treatment Rule; The Filter Backwash Recycling Rule; and, the Long Term 1 Enhanced Surface Water Treatment Rule.

4.2.2.4.1.2 Inorganic Contaminants:

Antimony: Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.

Arsenic: Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.

Asbestos: Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.

Barium: Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.

Beryllium: Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.

Cadmium: Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.

Chromium: Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.

Copper: 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.

Cyanide: 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.

Lead: 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.

Mercury (inorganic): Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.

Nickel: Some people who drink water containing nickel well in excess of the MCL over many years could experience heart and liver damage.

Nitrate: Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.

Nitrite: Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.

Selenium: Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.

Thallium: 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.

4.2.2.4.1.3 Synthetic Organic Compounds

2,4-D: 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.

2,4,5-TP [Silvex]: Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.

Acrylamide: Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.

Alachlor: Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.

Atrazine. Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.

Benzo(a)pyrene (PAH). Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.

Carbofuran: Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.

Chlordane: Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.

Dalapon: Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.

Di(2-ethylhexyl)adipate: 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.

Di(2-ethylhexyl)phthalate: 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.

Dibromochloropropane (DBCP): 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.

~~Dinoseb: Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.~~

~~Diquat: Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.~~

~~Dioxin (2,3,7,8-TCDD): 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.~~

~~Endothall: Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.~~

~~Endrin: Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.~~

~~Epichlorohydrin: Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.~~

~~Ethylene dibromide (EDB): Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.~~

~~Glyphosate: Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.~~

~~Heptachlor: Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.~~

~~Heptachlor Epoxide: Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.~~

~~Hexachlorobenzene: Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.~~

~~Hexachlorocyclopentadiene: Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.~~

~~Lindane: Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.~~

~~Methoxychlor: Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.~~

~~Oxamyl [Vydate]: Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.~~

~~PCBs [Polychlorinated Biphenyls]: 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.~~

~~Pentachlorophenol: Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.~~

~~Picloram: Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.~~

~~Simazine: Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.~~

~~Toxaphene: 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.~~

4.2.2.4.1.4 ~~Volatile Organic Compounds:~~

~~Benzene: Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.~~

~~Carbon Tetrachloride: Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.~~

~~Chlorobenzene [Monochlorobenzene]: Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.~~

~~o-Dichlorobenzene: Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.~~

~~p-Dichlorobenzene: Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.~~

~~1,2-Dichloroethane: Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.~~

~~1,1-Dichloroethylene:Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.~~

~~Cis-1,2-Dichloroethylene: Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.~~

~~Trans-1,2-Dichloroethylene: Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.~~

~~Dichloromethane: Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.~~

~~1,2-Dichloropropane: Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.~~

~~Ethylbenzene: Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.~~

~~Methyl [tert] Butyl Ether (MTBE): Some people who drink water containing MTBE in excess of the MCL over many years may experience problems of the central nervous system, including loss of muscle coordination, tremors, difficulty breathing, and drowsiness.~~

~~Styrene: Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.~~

~~Tetrachloroethylene: Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.~~

~~1,2,4-Trichlorobenzene: Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.~~

~~1,1,1-Trichloroethane: Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.~~

~~1,1,2-Trichloroethane: Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.~~

~~Trichloroethylene: 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.~~

~~Toluene: Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.~~

~~Vinyl Chloride: Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.~~

~~Xylenes: Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.~~

~~4.2.2.4.1.5 Radiological Compounds~~

~~Beta/photon emitters: 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.~~

Alpha emitters: Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.

Combined Radium 226/228: Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

Uranium: 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.

4.2.2.4.1.6 Disinfection/Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfection Residuals: Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs).

Chlorine: 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.

Chloramines: Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.

Chlorine dioxide, where any two consecutive daily samples taken at the entrance to the distribution system are above the 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.

Chlorine dioxide, where one or more distribution system samples are above the 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 exposure to chlorine dioxide-treated water.

Disinfection byproducts and treatment technique for DBPs: The United States Environmental Protection Agency (EPA) sets drinking water standards and requires the disinfection of drinking water. However, when used in the treatment of drinking water, disinfectants react with naturally-occurring organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA has determined that a number of DBPs are a health concern at certain levels of exposure. Certain DBPs, including some trihalomethanes (THMs) and some haloacetic acids (HAAs), have been shown to cause cancer in laboratory animals. Other DBPs have been shown to affect the liver and the nervous system, and cause reproductive or developmental effects in laboratory animals. Exposure to certain DBPs may produce similar effects in people. EPA has set standards to limit exposure to THMs, HAAs, and other DBPs.

Bromate: Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.

Chlorite: 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.

Haloacetic Acids (HAA): Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.

TTHMs [Total Trihalomethanes]: 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.

4.2.2.4.1.7 Public Notification for Fluoride: Notice of violations of the MCL for fluoride shall consist of the public notice prescribed in this section, plus a description of any steps which the system is taking to come into compliance. The public notice must contain the following language:

Drinking water containing fluoride in excess of the MCL over many years may cause mottling of children's teeth, usually in children less than nine years old. Mottling, also known as dental fluorosis, may include brown staining and/or pitting of the teeth, and occurs only in developing teeth before they erupt from the gums. Fluoride in drinking water at twice the MCL may cause bone disease, including pain and tenderness of the bones.

For more information, please call [name of water system contact] of [name of community water system] at [phone number]. Some home water treatment units are also available to remove fluoride from drinking water. To learn more about available home water treatment units, you may call NSF International at 1-877-8-NSF-HELP."

4.2.2.5 Public Notification by the State: The Division may give notice to the public required by this section on behalf of the owner of a public water system if the Division complies with the requirements of this section. However, the owner of the public water system remains legally responsible for ensuring that the requirements of this section are met.

4.2.2.6 Record Maintenance: Copies of public notices issued pursuant to section 4.2.2 of this part and certifications made to the Division pursuant to subsection 4.2.1.1.4 must be kept for five (5) years after issuance.

4.2.3 Frequency, Tier Designation and Distribution of Public Notification:

4.2.3.1 NPDWR Violations and Other Situations Requiring Public Notice[1]: Public notices shall be provided in accordance with the requirements of subsections 4.2.1, 4.2.2 and the following table:

Contaminant	**MCL/MRDL/TT violations[2]**		**Monitoring and Testing Procedure violations**	
	Tier of Public Notice Required	**Citation**	**Tier of Public Notice Required**	**Citation**
1. Violations of National Primary Drinking Water Regulations (NPDWR)[3]				
A. Microbiological Contaminants				
1. Total coliform	2	5.0	3	5.0
2. Fecal coliform/E. coli	1	5.0	[4]1,3	5.0
3. Turbidity MCL	2	7.0	3	7.0
4. Turbidity MCL (average of 2 days samples >5 NTU)	[5]2,1	7.1.1.2	3	7.1.2.2
5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level)	[6]2,1	7.1.2.1	3	7.1.2.2

6. Surface Water Treatment rule violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT)	2	10.4.1 10.4.2 The turbidity level of representative samples of a system's filtered water must at no time exceed five (5) NTU, measured as specified in section 10.6 10.4.3 10.9.1.2 10.13.1	3	10.5.1 10.10 10.13.1
7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT)	[7]2	10.7 10.8 10.9 10.13.1	3	10.8 10.10 10.13.1
8. Filter Backwash Recycling Rule violations.	2	10.12	3	10.12
9. Long Term 1 Enhanced Surface Water Treatment Rule violations]	2	10.13.1	3	10.13.1
10. Long Term 2 Enhanced Surface water Treatment Rule violations	2	10.14.11-10.14.21	[22]2,3	10.14.2-10.14.6 and 10.14.9-10.14.10
11.Ground Water Rule Violations	2	5.4	3	5.4.4.2
B. Inorganic Chemicals (IOCs)				
1. Antimony	2	6.1	3	6.1.2
2. Arsenic	2	[8]6.1	3	[11]6.1.2
3. Asbestos(fibers >10 microns)	2	6.1	3	6.1.2
4. Barium	2	6.1	3	6.1.2
5. Beryllium	2	6.1	3	6.1.2
6. Cadmium	2	6.1	3	6.1.2
7. Chromium (Total)	2	6.1	3	6.1.2
8. Cyanide	2	6.1	3	6.1.2]
9. Fluoride	1,2	6.1	3	6.1.2
10. Mercury (inorganic)	2	6.1	3	6.1.2
11. Nickel	2	6.1	3	6.1.2
12. Nitrate	1	6.1	[12]1,3	6.1.2
13. Nitrite	1	6.1	[12]1,3	6.1.2
14. Total Nitrate and Nitrite	1	6.1	3	6.1.2
15. Selenium	2	6.1	3	6.1.2
16. Thallium	2	6.1	3	6.1.2
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	6.7	3	6.7
D. Synthetic Organic Chemicals (SOCs)				

1. 2,4 - D	2	6.2.1.1	3	6.2.2
2. 2,4,5 – TP	2	6.2.1.1	3	6.2.2
3. Alachlor	2	6.2.1.1	3	6.2.2
4. Atrazine	2	6.2.1.1	3	6.2.2
5. Benzo(a)pyrene (PAHs)	2	6.2.1.1	3	6.2.2
6. Carbofuran	2	6.2.1.1	3	6.2.2
7. Chlordane	2	6.2.1.1	3	6.2.2
8. Dalapon	2	6.2.1.1	3	6.2.2
9. Di (2-ethylhexyl) adipate	2	6.2.1.1	3	6.2.2
10. Di (2-ethylhexyl) phthalate	2	6.2.1.1	3	6.2.2
11. Dibromochloropropane	2	6.2.1.1	3	6.2.2
12. Dinoseb	2	6.2.1.1	3	6.2.2]
13. Dioxin (2,3,7,8 – TCDD)	2	6.2.1.1	3	6.2.2
14. Diquat	2	6.2.1.1	3	6.2.2
15. Endothall	2	6.2.1.1	3	6.2.2
16. Endrin	2	6.2.1.1	3	6.2.2
17. Ethylene Dibromide	2	6.2.1.1	3	6.2.2
18. Glyphosate	2	6.2.1.1	3	6.2.2
19. Heptachlor	2	6.2.1.1	3	6.2.2
20. Heptachlor epoxide	2	6.2.1.1	3	6.2.2
21. Hexachlorobenzene	2	6.2.1.1	3	6.2.2
22. Hexachlorocyclopentadiene	2	6.2.1.1	3	6.2.2
23. Lindane	2	6.2.1.1	3	6.2.2
24. Methoxychlor	2	6.2.1.1	3	6.2.2
25. Oxamyl (Vydate)	2	6.2.1.1	3	6.2.2
26. Pentachlorophenol	2	6.2.1.1	3	6.2.2
27. Picloram	2	6.2.1.1	3	6.2.2
28. Polychlorinated biphenyls (PCBs)	2	6.2.1.1	3	6.2.2
29. Simazine	2	6.2.1.1	3	6.2.2
30. Toxaphene	2	6.2.1.1	3	6.2.2
E. Volatile Organic Chemicals (VOCs)				
1. Benzene	2	6.2.1.3	3	6.2.2
2. Carbon tetrachloride	2	6.2.1.3	3	6.2.2
3. Chlorobenzene (monochlorobenzene)	2	6.2.1.3	3	6.2.2
4. o-Dichlorobenzene	2	6.2.1.3	3	6.2.2
5. p-Dichlorobenzene	2	6.2.1.3	3	6.2.2
6. 1,2-Dichloroethane	2	6.2.1.3	3	6.2.2
7. 1,1-Dichloroethylene	2	6.2.1.3	3	6.2.2
8. cis-1,2,-Dichloroethylene	2	6.2.1.3	3	6.2.2
9. trans-1,2-Dichloroethylene	2	6.2.1.3	3	6.2.2

10. Dichloromethane	2	6.2.1.3	3	6.2.2
11. 1,2-Dichloropropane	2	6.2.1.3	3	6.2.2
12. Ethylbenzene	2	6.2.1.3	3	6.2.2
13. Styrene	2	6.2.1.3	3	6.2.2
14. Tetrachloroethylene	2	6.2.1.3	3	6.2.2
15. Toluene	2	6.2.1.3	3	6.2.2
16. 1,2,4-Trichlorobenzene	2	6.2.1.3	3	6.2.2
17. 1,1,1-Trichloroethane	2	6.2.1.3	3	6.2.2
18. 1,1,2-Trichloroethane	2	6.2.1.3	3	6.2.2
19. Trichloroethylene	2	6.2.1.3	3	6.2.2
20. Vinyl chloride	2	6.2.1.3	3	6.2.2
21. Xylenes (total)	2	6.2.1.3	3	6.2.2
22. Methyl tert Butyl Ether	2	6.2.1.3	3	6.2.2
F. Radioactive Contaminants				
1. Beta/photon emitters	2	9.1.1.4	3	9.2
2. Alpha emitters	2	9.1.1.3	3	9.2
3. Combined radium (226 & 228)	2	9.1.1.2	3	9.2
4. Uranium	[9]2	9.1.1.5	[10]3	9.2
G. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfection Residuals.[13]				
1. Total trihalomethanes (TTHMs)	2	[14]6.2.1.2	3	6.2.3
2. Haloacetic Acids (HAA5)	2	6.2.1.2	3	6.2.3
3. Bromate	2	6.2.1.2	3	6.2.3
4. Chlorite	2	6.2.1.2	3	6.2.3
5. Chlorine(MRDL)	2	8.3.1	3	8.4
6. Chloramine (MRDL)	2	8.3.1	3	8.4
7. Chlorine dioxide (MRDL), where any two consecutive daily samples at entrance to the distribution system only are above MRDL	2	8.3.1	2[15],3	8.4
8. Chlorine dioxide (MRDL), where sample(s) in distribution system the next day are also above MRDL	[16]1	8.3.1	1	8.4
9. Control of DBP precursors – TOC (TT)	2	8.7	3	8.7.1.1
10. Bench marking and disinfection profiling	N/A	N/A	3	10.8]
11. Development of monitoring plan	N/A	N/A	3	10.8
H. Other Treatment Techniques				
1. Acrylamide	2	6.3.3	N/A	N/A
2. Epichlorohydrin	2	6.3.3	N/A	N/A
II. Unregulated Contaminant Monitoring[17]				

A. Unregulated contaminants	N/A	N/A	3	CFR 141.40
III. Other Situations Requiring Public Notice				
A. Exceedance of nitrate MCL for non-community systems, as allowed by the Division	1	6.1.2.11	N/A	N/A
B. Availability of unregulated contaminant monitoring data	3	CFR 141.40	N/A	N/A
C. Waterborne disease outbreak	1	1.0	N/A	N/A
D. Other waterborne emergency[20]	1	N/A	N/A	N/A
E. Other situations as determined by the Division	[21]1,2,3	N/A	N/A	N/A
F. Source water sample positive for Ground Water Rule Fecal indicators: *E. coli*, enterococci, or coliphage.	1	5.4.3.7	N/A	N/A

[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 Division. The Division may, at their option, also require a more stringent public notice tier (e.g., Tier 1 instead of Tier 2 or Tier 2 instead of tier 3) for specific violations and situations listed in this Table, as authorized under section 4.2.1.1.5.

[2] MCL – Maximum Contaminant Level, MRDL – Maximum Residual Disinfectant Level, TT – Treatment Technique

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

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

[5] Systems that violate the turbidity MCL of 5 NTU based on an average of measurements over two consecutive days must consult with the Division within 24 hours after learning of the violation. Based on this consultation, the Division may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the Division in the 24-hour period, the violation is automatically elevated to Tier 1.

[6] Systems with treatment technique violations involving a single exceedance of a maximum turbidity limit under the Surface Water Treatment Rule (SWTR), the Interim Enhanced Surface Water Treatment Rule (IESWTR) or the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR are required to consult with the Division within 24 hours after learning of the violation. Based on this consultation, the Division may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the Division in the 24-hour period, the violation is automatically elevated to Tier 1.

[7] Most of the requirements of the IESWTR sections 10.7, 10.9 through 10.11 become effective January 1, 2002 for Subpart H systems (surface water systems and groundwater under the direct influence of surface water) serving at least 10,000 persons. However, section 10.8 has some requirements that become effective as early as April 16, 1999. The SWTR remains in effect for systems serving at least 10,000 persons even after 2002; the IESWTR adds additional requirements and does not in many cases supersede the SWTR.

[8] The arsenic MCL citations are effective January 23, 2006. Until then, the citations are §141.11(b) and §141.23(n).

[9] The uranium MCL Tier 2 violation citations are effective December 8, 2003 for all community water systems.

[10] The uranium Tier 3 violation citations are effective December 8, 2000 for all community water systems.

[11] The arsenic Tier 3 violation MCL citations are effective December 8, 2003 for all community water systems.

[12] Failure to take a confirmation sample within 24 hours for nitrate or nitrite after an initial sample exceeds the MCL is a Tier 1 violation. Other monitoring violations for nitrate are Tier 3.

[13] Subpart H community and non-transient non-community systems serving > 10,000 must comply with new DBP MCLs, disinfectant MRDLs, and related monitoring requirements beginning January 1, 2002. All other community and non-transient non-community systems must meet the MCLs and MRDLs beginning January 1, 2004. Subpart H transient non-community systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. Subpart H tran-

sient non-community systems serving fewer than 10,000 persons and using only groundwater not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.

[14] CFR 141.64(b)(1) 141.132(a)-(b) apply until §§141.620-141.630 take effect under the schedule in §141.620(c).

[15] Failure to monitor for chlorine dioxide at the entrance to the distribution system the day after exceeding the MRDL at the entrance to the distribution system is a Tier 2 violation.

[16] If any daily sample taken at the entrance to the distribution system exceeds the MRDL for chlorine dioxide and one or more samples taken in the distribution system the next day exceed the MRDL, Tier 1 notification is required. Failure to take the required samples in the distribution system after the MRDL is exceeded at the entry point also triggers Tier 1 notification.

[17] Some water systems must monitor for certain unregulated contaminants listed in CFR 141.40

[20] Other waterborne emergencies require a Tier 1 public notice under section 4.2.1.1.1.1.8 for situations that do not meet the definition of a waterborne disease outbreak given in 40 CFR 141.2 but that still have the potential to have serious adverse effects on health as a result of short-term exposure. These could include outbreaks not related to treatment deficiencies, as well as situations that have the potential to cause outbreaks, such as failures or significant interruption in water treatment processes, natural disasters that disrupt the water supply or distribution system, chemical spills, or unexpected loading of possible pathogens into the source water.

[21] The Division may place other situations in any tier it believes appropriate, based on threat to public health.

[22] Failure to collect three or more samples for *Cryptosporidium* analysis is a Tier 2 violation requiring special notice as specified in section 4.2.1.1.1.1.6. All other monitoring and testing violations are Tier 3.

4.2.3.2 Notification to New Billing Units:

4.2.3.2.1 The owner of a community public water system must give a copy of the most recent public notice for any outstanding violation of any MCL, MRDL, or any treatment technique requirement, or monitoring violation to all new billing units or new hookups prior to or at the time service begins.

4.2.3.2.2 Non-community water systems must continuously post the public notice in conspicuous locations in order to inform new consumers of any continuing violation, variance or exemption, or other situation requiring a public notice for as long as the violation, variance, exemption, or other situation persists.

4.2.3.3 All posted public notices shall remain readable and be protected by glass, plastic or some other suitable covering and remain in place until such time that the violation or failure has terminated or seven (7) days, whichever is longer.

4.2.3.4 Notice to the public required by this section may be given by the Division should the water supplier fail to do so.

4.2.3.5 Nothing in this section shall limit the authority of the Secretary, Delaware Health and Social Services to require notification by newspaper and to radio and television stations when circumstances make more immediate or broader notice appropriate to protect the public's health.

4.2.4 Public Notification Requirements Pertaining to Lead

4.2.4.1 Applicability of Public Notification Requirements

4.2.4.1.1 [Reserved]

4.2.4.1.2 Definition of lead free. For the purposes of this paragraph, the term "lead free" when used with respect to solders and flux refers to solder and flux containing not more than 0.2 percent lead; when used with respect to pipes and pipe fittings, refers to pipes and pipe fittings containing not more than 8.0 percent lead; and when used with respect to plumbing fittings and fixtures intended by the manufacturer to dispense water for human ingestion refers to fittings and fixtures that are in compliance with standards established in accordance with 42 U.S.C. 300g-6(e).

4.2.4.1.3 The owner shall review, correct and complete the public notice and return it to the Division within seventy-two (72) hours with approval noted.

4.2.4.2 Manner of Notification

4.2.4.2.1 Notice shall be given to persons served by the PWS either by:

4.2.4.2.1.1 Three newspaper notices one ((1) for each of three (3) consecutive months and the first no later than June 19, 1988) or;

4.2.4.2.1.2 Once by mail notice with the water bill or in a separate mailing by June 19, 1988 or;

4.2.4.2.1.3 Once by hand delivery by June 19, 1988.

4.2.4.2.2 For NTNCWS, notice may be given by continuous posting. If posting is used, the notice shall be posted in a conspicuous place in the area served by the system and start no later than June 19, 1988, and continue for three (3) months.

4.2.4.3 General Content of Notice

4.2.4.3.1 Notices issued under this section shall provide a clear and readily understandable explanation of the potential sources of lead in drinking water, potential adverse health effects, reasonable available methods of mitigating known or potential lead content in drinking water, any steps the water system is taking to mitigate lead content in drinking water and the necessity for seeking alternative water supplies, if any. Use of the mandatory language in subsection 4.2.4.4 in the notice will be sufficient to explain potential adverse health effects.

4.2.4.3.2 Each notice shall also include specific advice on how to determine if materials containing lead have been used in homes or the water distribution system and how to minimize exposure to water likely to contain high levels of lead. Each notice shall be conspicuous and shall not contain unduly technical language, unduly small print, or similar problems that frustrate the purpose of the notice. Each notice shall contain the telephone number of the owner, operator or designee of the PWS as a source of additional information regarding the notice. Where appropriate, the notice shall be multi-lingual.

4.2.4.4 Mandatory Heath Effects Information: When providing the information in public notices required under subsection 4.2.4.3 on the potential adverse health effects of lead in drinking water, the owner of the water system shall include the following mandatory language specific to lead.

4.2.4.4.1 Lead: The United States Environmental Protection Agency (USEPA) sets drinking water standards and has determined that lead is a health concern at certain levels of exposure. There is currently a standard of 0.020 parts per million (ppm). Part of the purpose of this notice is to inform you of the potential adverse health effects of lead. This is being done even though your water may not be in violation of the current standard. The USEPA and others are concerned about lead in drinking water. Too much lead in the human body can cause serious damage to the brain, kidneys, nervous system and red blood cells. The greatest risk, even with short-term exposure, is to young children and pregnant women. Lead levels in your drinking water are likely to be highest:

- if your home or water system has lead pipes, or
- if your home has copper pipes with lead solder, and
- if the home is less than five (5) years old
- if you have soft or acidic water, or
- if water sits in the pipes for several hours.

4.2.5 Public Notification Requirements Pertaining to VOCs and MRDLs: If a CWS or NTNCWS fails to comply with an applicable MCL or MRDL level established under subsections 6.1.1 and 8.3, the water supplier shall notify persons served by the system as provided in subsection 4.2.3.

4.2.6 Public Notification Requirements Pertaining to Unregulated Contaminants:

4.2.6.1 The owner of a community water system or non-transient, non-community water system required to monitor under CFR 141.40 must notify persons served by the system of the availability of the results of such sampling no later than 90 days after the monitoring results are known.

4.2.6.2 The form and manner of the public notice must follow the requirements for a Tier 3 public notice prescribed in subsection 4.2.1.3.3. The notice must also identify a person and provide the telephone number to contact for information on the monitoring results.

4.2.7 Procedures for Issuance of a Public Notice

4.2.7.1 PMCL Violation:

4.2.7.1.1 Upon notification that a condition exists as indicated in subsection 4.2.1.1, the Division shall prepare a notice in accordance with subsection 4.2.2 and a draft public notice for use in public notification by the water supply owner.

4.2.7.1.2 As soon as possible, but in no case more than twenty-four (24) hours, the Division shall forward the notice and draft notice to the water supply owner.

4.2.7.1.3 The owner shall review, correct and complete the public notice and return it to the Division within twenty-four (24) hours with approval noted.

4.2.7.1.4 The Division shall resolve any discrepancies and approve the public notice as rapidly as possible and retain the public notice until the final confirmation sample results are received.

4.2.7.1.5 Upon receipt of the confirmation sampling results, the Division shall determine if a public notice is warranted and shall return the approved public notice to the owner for appropriate public notification.

4.2.7.1.6 For all Tier 1 violations as noted in subsection 4.2.1.1 the owner shall notify the Division as soon as possible. However, the owner shall be responsible for issuing the public notice to consumers within twenty-four (24) hours.

4.2.7.2 Other Violations or Circumstances Requiring Public Notification:

4.2.7.2.1 Upon notification that a condition exists as indicated in sections 4.2.1.2. and 4.2.1.3, the Division shall initiate the preparation of a draft public notice and notice if appropriate.

4.2.7.2.2 As soon as possible, but in no case more than seventy-two (72) hours, the Division shall forward a copy of the draft public notice with attached notice, if applicable, to the water supply owner.

4.2.7.2.3 The owner shall review, correct and complete the public notice and return it to the Division within seventy-two (72) hours with approval noted.

4.2.7.2.4 The Division shall resolve any discrepancies and approve the public notice as rapidly as possible.

4.2.7.2.5 The Division shall then return the approved public notice to the owner for appropriate public notification.

4.3 Consumer Confidence Reports:

4.3.1 Purpose and applicability:

4.3.1.1 This section establishes the minimum requirements for the content of annual reports that community water systems must deliver to their customers. These reports must contain information on the quality of the water delivered by the systems and characterize the risks (if any) from exposure to contaminants detected in the drinking water in an accurate and understandable manner.

4.3.1.1.1 This section applies only to community water systems.

4.3.1.1.2 For purposes of this section, customers are defined as billing units or service connections to which water is delivered by a community water system.

4.3.1.1.3 For purposes of this section, detected means: at or above the levels prescribed by CFR 141.23(a)(4) for inorganic contaminants, at or above the levels prescribed by CFR 141.24(f)(7) for the contaminants listed in subsection 6.2.1.3, at or above the level prescribed by CFR 141.24(h)(18) for the contaminants listed in subsection 6.2.1.1, and at or above the levels prescribed by CFR 141.25(c) for radioactive contaminants.

4.3.2 Effective dates:

4.3.2.1 The regulations in this section shall take effect on September 18, 1998.

4.3.2.1.1 Each existing community water system must deliver its first report by October 19, 1999, its second report by July 1, 2000, and subsequent reports by July 1 annually thereafter. The first report must contain data collected during, or prior to, calendar year 1998 as prescribed in subsection 4.3.4. Each report thereafter must contain data collected during, or prior to, the previous calendar year.

4.3.2.1.2 A new community water system must deliver its first report by July 1 of the year after its first full calendar year in operation and annually thereafter.

4.3.2.1.3 A community water system that sells water to another community water system must deliver the applicable information required in subsection 4.3.3 to the buyer system:

4.3.2.1.3.1 No later than April 19, 1999, by April 1, 2000, and by April 1 annually thereafter; or,

4.3.2.1.3.2 On a date mutually agreed upon by the seller and the purchaser and specifically included in a contract between the parties.

4.3.3 Content of the reports: Each community water system must provide to its customers an annual report that contains the information specified in this section and subsection 4.3.4.

4.3.3.1 Each community water system must provide to its customers an annual report that contains the information specified in this section and subsection 4.3.4.

4.3.3.2 Information on the source of the water delivered:

4.3.3.2.1 Each report must identify the source(s) of the water delivered by the community water system by providing information on:

4.3.3.2.1.1 The type of the water: e.g., surface water, ground water; and

4.3.3.2.1.2 The commonly used name (if any) and location of the body (or bodies) of water.

4.3.3.2.2 If a source water assessment has been completed, the report must notify consumers of the availability of this information and the means to obtain it. In addition, systems are encouraged to highlight in the report significant sources of contamination in the source water area if they have readily available information. Where a system has received a source water assessment from the Division, the report must include a brief summary of the system's susceptibility to potential sources of contamination, using language provided by the Division or written by the operator.

4.3.3.3 Definitions.

4.3.3.3.1 Each report must include the following definitions:

4.3.3.3.1.1 Maximum Contaminant Level Goal or MCLG: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

4.3.3.3.1.2 Maximum Contaminant Level or MCL: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

4.3.3.3.1.3 Maximum Residual Disinfectant Level Goal or MRDLG: The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

4.3.3.3.1.4 Maximum Residual Disinfectant Level or MDRDL: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control microbial contaminants.

4.3.3.3.2 A report which contains data on a contaminant for which the Division has set a treatment technique or an action level must include one or both of the following definitions as applicable:

4.3.3.3.2.1 Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

4.3.3.3.2.2 Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

4.3.3.4 Information on Detected Contaminants.

4.3.3.4.1 This sub-section specifies the requirements for information to be included in each report for contaminants subject to mandatory monitoring (except *Cryptosporidium*). It applies to:

4.3.3.4.1.1 Contaminants subject to an MCL, MRDL, action level, or treatment technique (regulated contaminants);

4.3.3.4.1.2 Contaminants for which monitoring is required by CFR 141.40 (unregulated contaminants); and

4.3.3.4.1.3 Disinfection byproducts or microbial contaminants for which monitoring is required by sections CFR 141.142 and 141.143 except as provided under subsection 4.3.3.5.1 and which are detected in the finished water.

4.3.3.4.2 The data relating to these contaminants must be displayed in one table or in several adjacent tables. Any additional monitoring results which a community water system chooses to include in its report must be displayed separately.

4.3.3.4.3 The data must be derived from data collected to comply with EPA and State monitoring and analytical requirements during calendar year 1998 for the first report and subsequent calendar years thereafter except that:

4.3.3.4.3.1 Where a system is allowed to monitor for regulated contaminants less often than once a year, the table(s) must include the date and results of the most recent sampling and the report must include a brief statement indicating that the data presented in the report are from the most recent testing done in accordance with the regulations. No data older than 5 years need be included.

4.3.3.4.3.2 Results of monitoring in compliance with 40 CFR 14.40 (Unregulated Contaminant Monitoring Rule) need only be included for 5 years from the date of last sample or until any of the detected contaminants becomes regulated and subject to routine monitoring requirements, whichever comes first.

4.3.3.4.4 For detected regulated contaminants (listed in section 4.3.6), the table(s) must contain:

4.3.3.4.4.1 The MCL for that contaminant expressed as a number equal to or greater than 1.0 (as provided in section 4.3.6);

4.3.3.4.4.2 The MCLG for that contaminant expressed in the same units as the MCL;

4.3.3.4.4.3 If there is no MCL for a detected contaminant, the table must indicate that there is a treatment technique, or specify the action level, applicable to that contaminant, and the report must include the definitions for treatment technique and/or action level, as appropriate, specified in subsection 4.3.3.3.3;

4.3.3.4.4.4 For contaminants subject to an MCL, except turbidity and total coliforms, the highest contaminant level used to determine compliance with an NPDWR and the range of detected levels, as follows:

4.3.3.4.4.4.1 When compliance with the MCL is determined annually or less frequently: The highest detected level at any sampling point and the range of detected levels expressed in the same units as the MCL.

4.3.3.4.4.4.2 When compliance with the MCL is determined by calculating a running annual average of all samples taken at a monitoring location: the highest average of any of the monitoring locations and the range of all monitoring locations expressed in the same units as the MCL. For the MCLs for TTHM and HAA5 in subsection 6.2.1.2, systems must include the highest locational running annual average for TTHM and HAA5 and the range of individual sample results for all monitoring locations expressed in the same units as the MCL. If more than one location exceeds TTHM or HAA5 MCL, the system must include the locational running annual average for all locations that exceed the MCL.

4.3.3.4.4.4.3 When compliance with the MCL is determined on a system-wide basis by calculating a running annual average of all samples at all monitoring locations: the average and range of detection expressed in the same units as the MCL. The system is required to include individual sample results for the IDSE conducted under subsection 8.8 when determining the range of the TTHM and HAA5 results to be reported in the annual consumer confidence report for the calendar year that the IDSE samples were taken.

Note to subsection 4.3.3.4.4.4): When rounding of results to determine compliance with the MCL is allowed by the regulations, rounding should be done prior to multiplying the results by the factor listed in subsection 4.3.6;

4.3.3.4.4.5 For turbidity.

4.3.3.4.4.5.1 When it is reported pursuant to subsection 7.1.1: The highest average monthly value.

4.3.3.4.4.5.2 When it is reported pursuant to the requirements of 40 CFR 141.71: the highest monthly value. The report should include an explanation of the reasons for measuring turbidity.

4.3.3.4.4.5.3 When it is reported pursuant to subsections 10.4, 10.9 or 10.4.4: The highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in sections 10.4, 10.9 or 10.4.4 for the filtration technology being used. The report should include an explanation of the reasons for measuring turbidity;

4.3.3.4.4.6 For lead and copper: the 90th percentile value of the most recent round of sampling and the number of sampling sites exceeding the action level;

4.3.3.4.4.7 For total coliform:

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

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

4.3.3.4.4.8 For fecal coliform: The total number of positive samples; and

4.3.3.4.4.9 The likely source(s) of detected contaminants to the best of the operator's knowledge. Specific information regarding contaminants may be available in sanitary surveys and source water assessments, and should be used when available to the operator. If the operator lacks specific information on the likely source, the report must include one or more of the typical sources for that contaminant listed in 4.3.7 to this section which are most applicable to the system.

4.3.3.4.4.10 Community water systems that detect TTHM above 0.080 mg/L in subsection 6.2.1.2 as an annual average, monitored and calculated in accordance with section 6.2.3 must include health effects language for TTHMs prescribed in subsection 4.2.2.5.6.

4.3.3.4.5 If a community water system distributes water to its customers from multiple hydraulically independent distribution systems that are fed by different raw water sources, the table should contain a separate column for each service area and the report should identify each separate

distribution system. Alternatively, systems could produce separate reports tailored to include data for each service area.

4.3.3.4.6 The table(s) must clearly identify any data indicating violations of MCLs, MRDLs or treatment techniques and the report must contain a clear and readily understandable explanation of the violation including: the length of the violation, the potential adverse health effects, and actions taken by the system to address the violation. To describe the potential health effects, the system must use the relevant language of 4.2.2.5.

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

4.3.3.5 Information on *Cryptosporidium*, radon, and other contaminants:

4.3.3.5.1 If the system has performed any monitoring for *Cryptosporidium*, including monitoring performed to satisfy the requirements of CFR 141.143, which indicates that *Cryptosporidium* may be present in the source water or the finished water, the report must include:

4.3.3.5.1.1 A summary of the results of the monitoring; and

4.3.3.5.1.2 An explanation of the significance of the results.

4.3.3.5.2 If the system has performed any monitoring for radon which indicates that radon may be present in the finished water, the report must include:

4.3.3.5.2.1 The results of the monitoring; and

4.3.3.5.2.2 An explanation of the significance of the results.

4.3.3.5.3 If the system has performed additional monitoring which indicates the presence of other contaminants in the finished water, EPA strongly encourages systems to report any results which may indicate a health concern. To determine if results may indicate a health concern, EPA recommends that systems find out if EPA has proposed an NPDWR or issued a health advisory for that contaminant by calling the Safe Drinking Water Hotline (800-426-4791). If the US EPA has developed and published a final health advisory then the system must report the results in accordance with this section. EPA considers detects above a proposed MCL or health advisory level to indicate possible health concerns. For such contaminants, EPA recommends that the report include:

4.3.3.5.3.1 The results of the monitoring; and

4.3.3.5.3.2 An explanation of the significance of the results noting the existence of a health advisory or a proposed regulation.

4.3.3.6 Compliance with NPDWR. In addition to the requirements of subsection 4.3.3.6.7, the report must note any violation that occurred during the year covered by the report of a requirement listed below, and include a clear and readily understandable explanation of the violation, any potential adverse health effects, and the steps the system has taken to correct the violation.

4.3.3.6.1 Monitoring and reporting of compliance data;

4.3.3.6.2 Filtration and disinfection prescribed by 4.3.3.8. For systems which have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of such equipment or processes which constitutes a violation, the report must include the following language as part of the explanation of potential adverse health effects: Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

4.3.3.6.3 Lead and copper control requirements prescribed by subsection 6.1.7. For systems which fail to take one or more actions prescribed by 6.1.7.1.2, 6.1.7.2, 6.1.7.3, 6.1.7.4, and 6.1.7.5, the report must include the applicable language of 4.2.2.5 for lead, copper, or both.

4.3.3.6.4 Treatment techniques for Acrylamide and Epichlorohydrin prescribed by section 6.3.3. For systems which violate the requirements of subsection 6.3.3, the report must include the relevant language from 4.2.2.5.

4.3.3.6.5 Recordkeeping of compliance data.

4.3.3.6.6 Special monitoring requirements prescribed by subsections 6.1.2 and 6.1.4; and

4.3.3.6.7 Violation of the terms of a bilateral compliance agreement, or an administrative or judicial order.

4.3.3.6.8 A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the bilateral compliance agreement.

4.3.3.8 Additional information:

4.3.3.8.1 The report must contain a brief explanation regarding contaminants which may reasonably be expected to be found in drinking water including bottled water. This explanation may include the language of subsections 4.3.3.8.1 through 4.3.3.8.1.3 or systems may use their own comparable language. The report also must include the language of subsection 4.3.3.8.1.4.

4.3.3.8.1.1 The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

4.3.3.8.1.2 Contaminants that may be present in source water include:

4.3.3.8.1.2.1 Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

4.3.3.8.1.2.2 Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

4.3.3.8.1.2.3 Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

4.3.3.8.1.2.4 Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

4.3.3.8.1.2.5 Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

4.3.3.8.1.3 In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

4.3.3.8.1.4 Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

4.3.3.8.2 The report must include the telephone number of the owner, operator, or designee of the community water system as a source of additional information concerning the report.

4.3.3.8.3 In communities with a large proportion of non-English speaking residents, as determined by the Division, the report must contain information in the appropriate language(s) regarding the importance of the report or contain a telephone number or address where such residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language.

4.3.3.8.4 The report must include information (e.g., time and place of regularly scheduled board meetings) about opportunities for public participation in decisions that may affect the quality of the water.

4.3.3.8.5 The systems may include such additional information as they deem necessary for public education consistent with, and not detracting from, the purpose of the report.

4.3.3.8.6 Systems required to comply with section 5.4 Ground Water Rule.

4.3.3.8.6.1 Any ground water system that receives notice from the Division of a significant deficiency or notice from a laboratory of a fecal indicator-positive ground water source sample that is not invalidated by the Division under subsection 5.4.3.4 must inform its customers of any significant deficiency that is uncorrected at the time of the next report or of any fecal indicator-positive ground water source sample in the next report. The system must continue to inform the public annually until the Division determines that particular significant deficiency is corrected or the fecal contamination in the ground water source is addressed under subsection 5.4.4.1. Each report must include the following elements.

4.3.3.8.6.1.1 The nature of the particular significant deficiency or the source of the fecal contamination (if the source is known) and the date the significant deficiency was identified by the Division or the dates of the fecal indicator-positive ground water source samples;

4.3.3.8.6.1.2 If the fecal contamination in the ground water source has been addressed under subsection 5.4.4.1 and the date of such action;

4.3.3.8.6.1.3 For each significant deficiency or fecal contamination in the ground water source that has not been addressed under subsection 5.4.4.1, the Division-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed; and

4.3.3.8.6.1.4 If the system receives notice of a fecal indicator-positive ground water source sample that is not invalidated by the division under subsection 5.4.3.4, the potential health effects using the health effects language of subsection 4.2.2.5.1.

4.3.3.8.6.2 If directed by the Division, a system with significant deficiencies that have been corrected before the next report is issued must inform its customers of the significant deficiency, how the deficiency was corrected, and the date of the correction under subsection 4.3.3.8.6.1.

4.3.4 Required additional health information:

4.3.4.1 All reports must prominently display the following language:

4.3.4.1.1 Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

4.3.4.1.2 Ending in the reports due by July 1, 2001 a system which detects arsenic at levels above 0.025 mg/L, but below 0.05 mg/L and beginning in the report due by July 1, 2002 a system that detects arsenic above 0.005 mg/L and up to and including 0.010 mg/L:

4.3.4.1.2.1 Must include in its report a short informational statement about arsenic, using language such as: While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

4.3.4.1.2.2 May write its own educational statement, but only in consultation with the Division.

4.3.4.3 A system which detects nitrate at levels above 5 mg/l, but below the MCL:

4.3.4.3.1 Must include a short informational statement about the impacts of nitrate on children using language such as: Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

4.3.4.3.2 May write its own educational statement, but only in consultation with the Division.

4.3.4.4 Every report must include the following lead-specific information:

4.3.4.4.1 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 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water,

testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

4.3.4.4.2 A system may write its own educational statement, but only in consultation with the Division.

4.3.5 Report delivery and recordkeeping:

4.3.5.1 Except as provided in 4.3.5.7,

4.3.5.1.1 Each community water system must mail or otherwise directly deliver one copy of the report to each customer.

4.3.5.2 The system must make a good faith effort to reach consumers who do not get water bills, using means recommended by the Division. EPA expects that an adequate good faith effort will be tailored to the consumers who are served by the system but are not bill-paying customers, such as renters or workers. A good faith effort to reach consumers would include a mix of methods appropriate to the particular system such as: Posting the reports on the Internet; mailing to postal patrons in metropolitan areas; advertising the availability of the report in the news media; publication in a local newspaper; posting in public places such as cafeterias or lunch rooms of public buildings; delivery of multiple copies for distribution by single-biller customers such as apartment buildings or large private employers; delivery to community organizations.

4.3.5.3 No later than the date the system is required to distribute the report to its customers, each community water system must mail a copy of the report to the Division, followed within ten (10) days by a certification that the report has been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to the Division.

4.3.5.4 No later than the date the system is required to distribute the report to its customers, each community water system must deliver the report to any other agency or clearinghouse identified by the Division.

4.3.5.5 Each community water system must make its reports available to the public upon request.

4.3.5.6 Each community water system serving 100,000 or more persons must post its current year's report to a publicly-accessible site on the Internet.

4.3.5.7 Community water systems serving fewer than 10,000 persons may forego the requirements under subsection 4.3.5.1.1 of this section if they comply with the following:

4.3.5.7.1 Such systems must:

4.3.5.7.1.1 Publish the reports in one or more local newspapers serving the area in which the system is located;

4.3.5.7.1.2 Inform the customers that the reports will not be mailed, either in the newspapers in which the reports are published or by other means approved by the State; and

4.3.5.7.1.3 Make the reports available to the public upon request.

4.3.5.7.2 Systems serving 500 or fewer persons may forego the requirements of subsections 4.3.5.7.1.1 and 4.3.5.7.1.2 if they provide notice at least once per year to their customers by mail, door-to-door delivery or by posting in an appropriate location that the report is available upon request.

4.3.5.8 Any system subject to this section must retain copies of its consumer confidence report for no less than 5 years.

4.3.6 Converting MCL Compliance Values for Consumer Confidence Reports

Key

AL=Action Level

MCL=Maximum Contaminant Level

MCLG=Maximum Contaminant Level Goal

MFL=million fibers per liter

mrem/year=millirems per year (a measure of radiation absorbed by the body)

MRDL=Maximum Residual Disinfection Level

MRDLG=Maximum Residual Disinfection Level Goal

NTU=Nephelometric Turbidity Units

pCi/l=picocuries per liter (a measure of radioactivity)

ppm=parts per million, or milligrams per liter (mg/l)

ppb=parts per billion, or micrograms per liter (μg/l)

ppt=parts per trillion, or nanograms per liter

ppq=parts per quadrillion, or picograms per liter

TT=Treatment Technique

Contaminant	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG
Microbiological Contaminants				
1. Total coliform bacteria	MCL: (systems that collect >40 samples/month) 5% of monthly samples are positive; (systems that collect <40 samples/month) 1 positive monthly sample.			0
2. Fecal coliform and E. coli	A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or E. coli positive.			0
3. Fecal Indicators (enterococci or coliphage)	TT		TT	N/A
4. Total organic carbon (ppm)	TT		TT	N/A
5. Turbidity	TT (NTU)		TT	n/a
Radioactive Contaminants				
6. Beta/photon emitters	4 mrem/yr		4 mrem/yr	0
7. Alpha emitters	15 pCi/l		15 pCi/l	0
8. Combined radium	5 pCi/l		5 pCi/l	0
9. Uranium	30 µg/L		30 µg/L	
Inorganic Contaminants				
10. Antimony	.006	1000	6 ppb	6
11. Arsenic	.010	1000	10	0
12. Asbestos	7 MFL		7 MFL	7
13. Barium	2		2 ppm	2
14. Beryllium	.004	1000	4 ppb	4
15. Cadmium	.005	1000	5 ppb	5
16. Chromium	.1	1000	100 ppb	100
17. Copper	AL=1.3		AL=1.3 ppm	1.3
18. Cyanide	.2	1000	200 ppb	200
19. Fluoride	2.0		2.0 ppm	2.0
20. Lead	AL=.015	1000	AL=15 ppb	0
21. Mercury (inorganic)	.002	1000	2 ppb	2
22. Nitrate (as Nitrogen)	10		10 ppm	10
23. Nitrite (as Nitrogen)	1		1 ppm	1
23a. Nitrate/nitrite (as Nitrogen)	10		10 ppm	10
24. Selenium	.05	1000	50 ppb	50
25. Thallium	.002	1000	2 ppb	0.5
Synthetic Organic Contaminants including Pesticides and Herbicides				
26. 2,4-D	.07	1000	70 ppb	70
27. 2,4,5-TP [Silvex]	.05	1000	50 ppb	50
28. Acrylamide	TT		TT	0
29. Alachlor	.002	1000	2 ppb	0

30. Atrazine	.003	1000	3 ppb	3
31. Benzo(a)pyrene [PAH]	.0002	1,000,000	200 ppt	0
32. Carbofuran	.04	1000	40 ppb	40
33. Chlordane	.002	1000	2 ppb	0
34. Dalapon	.2	1000	200 ppb	200
35. Di(2-ethylhexyl)adipate	.4	1000	400 ppb	400
36. Di(2-ethylhexyl) phthalate	.006	1000	6 ppb	0
37. Dibromochloropropane	.0002	1,000,000	200 ppt	0
38. Dinoseb	.007	1000	7 ppb	7
39. Diquat	.02	1000	20 ppb	20
40. Dioxin [2,3,7,8-TCDD]	.00000003	1,000,000,000	30 ppq	0
41. Endothall	.1	1000	100 ppb	100
42. Endrin	.002	1000	2 ppb	2
43. Epichlorohydrin	TT		TT	0
44. Ethylene dibromide	.00005	1,000,000	50 ppt	0
45. Glyphosate	.7	1000	700 ppb	700
46. Heptachlor	.0004	1,000,000	400 ppt	0
47. Heptachlor epoxide	.0002	1,000,000	200 ppt	0
48. Hexachlorobenzene	.001	1000	1 ppb	0
49. hexachlorocyclopentadiene	.05	1000	50 ppb	50
50. Lindane	.0002	1,000,000	200 ppt	200
51. Methoxychlor	.04	1000	40 ppb	40
52. Oxamyl [Vydate]	.2	1000	200 ppb	200
53. PCBs [Polychlorinated biphenyls]	.0005	1,000,000	500 ppt	0
54. Pentachlorophenol	.001	1000	1 ppb	0
55. Picloram	.5	1000	500 ppb	500
56. Simazine	.004	1000	4 ppb	4
57. Toxaphene	.003	1000	3 ppb	0
Volatile Organic Contaminants				
58. Benzene	.005	1000	5 ppb	0
59. Bromate	.010	1000	10	0
60. Carbon tetrachloride	.005	1000	5 ppb	0
61. Chloramines	MRDL = 4.0		MRDL = 4.0	MRDLG =4.0
62. Chlorine	MRDL = 4.0		MRDL =4.0	MRDLG =4.0
63. Chlorite	1		1	0.8
64. Chlorine dioxide	MRDL = .8	1000	MRDL = 800	MRDLG = 800
65. Chlorobenzene	.1	1000	100 ppb	100
66. o-Dichlorobenzene	.6	1000	600 ppb	600
67. p-Dichlorobenzene	.075	1000	75 ppb	75

68. 1,2-Dichloroethane	.005	1000	5 ppb	0
69. 1,1-Dichloroethylene	.007	1000	7 ppb	7
70. cis-1,2-Dichloroethylene	.07	1000	70 ppb	70
71. trans-1,2-Dichloroethylene	.1	1000	100 ppb	100
72. Dichloromethane	.005	1000	5 ppb	0
73. 1,2-Dichloropropane	.005	1000	5 ppb	0
74. Ethylbenzene	.7	1000	700 ppb	700
75. Haloacetic acids (HAA)	.060	1000	60 ppb	N/A
76. Methyl *tert* Butyl Ether	.01	1000	10 ppb	0
77. Styrene	.1	1000	100 ppb	100
78. Tetrachloroethylene	.001	1000	1 ppb	0
79. 1,2,4-Trichlorobenzene	.07	1000	70 ppb	70
80. 1,1,1-Trichloroethane	.2	1000	200 ppb	200
81. 1,1,2-Trichloroethane	.005	1000	5 ppb	3
82. Trichloroethylene	.001	1000	1 ppb	0
83. TTHMs [Total trihalomethanes]	0.10/0.080	1000	100/80 ppb	N/A
84. Toluene	1		1 ppm	1
85. Vinyl Chloride	.001	1000	1 ppb	0
86. Xylenes	10		10 ppm	10
. Control of DBP Precursors (TOC)	TT		TT	N/A

4.3.7 Regulated contaminants and sources in drinking water: Sources of contamination for regulated compounds.

Contaminant	**Major sources in drinking water**
Microbiological Contaminants	
1. Total Coliform Bacteria	Naturally present in the environment
2. Fecal coliform and E. coli	Human and animal fecal waste.
3. Fecal Indicators (enterococci or coliphage)	Human and animal fecal waste.
4. Total organic carbon (ppm)	Naturally present in the environment
5. Turbidity	Soil runoff
Radioactive Contaminants	
6. Beta/photon emitters	Decay of natural and man-made deposits.
7. Alpha emitters	Erosion of natural deposits.
8. Combined radium	Erosion of natural deposits.
9. Uranium	Erosion of natural deposits.
Inorganic Contaminants	
10. Antimony	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder.
11. Arsenic	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.

12. Asbestos	Decay of asbestos cement water mains; Erosion of natural deposits.
13. Barium	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
14. Beryllium	Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries.
15. Cadmium	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; runoff from waste batteries and paints.
16. Chromium	Discharge from steel and pulp mills; Erosion of natural deposits.
17. Copper	Corrosion of household plumbing systems; Erosion of natural deposits.
18. Cyanide	Discharge from steel/metal factories; Discharge from plastic and fertilizer factories.
19. Fluoride	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.
20. Lead	Corrosion of household plumbing systems; Erosion of natural deposits.
21. Mercury [inorganic]	Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland.
22. Nitrate [as Nitrogen]	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
23. Nitrite [as Nitrogen]	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
23a. Nitrate/nitrite (as Nitrogen)	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
24. Selenium	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.
25. Thallium	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories.
Synthetic Organic Contaminants including Pesticides and Herbicides	
26. 2,4-D	Runoff from herbicide used on row crops.
27. 2,4,5-TP [Silvex]	Residue of banned herbicide.
28. Acrylamide	Added to water during sewage/ wastewater treatment.
29. Alachlor	Runoff from herbicide used on row crops.
30. Atrazine	Runoff from herbicide used on row crops.
31. Benzo(a)pyrene [PAH]	Leaching from linings of water storage tanks and distribution lines.
32. Carbofuran	Leaching of soil fumigant used on rice and alfalfa.
33. Chlordane	Residue of banned termiticide.
34. Dalapon	Runoff from herbicide used on rights of way.
35. Di(2-ethylhexyl) adipate	Discharge from chemical factories.
36. Di(2-ethylhexyl) phthalate	Discharge from rubber and chemical factories.
37. Dibromochloropropane	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards.
38. Dinoseb	Runoff from herbicide used on soybeans and vegetables.

39. Diquat	Runoff from herbicide use.
40. Dioxin [2,3,7,8-TCDD]	Emissions from waste incineration and other combustion; Discharge from chemical factories.
41. Endothall	Runoff from herbicide use.
42. Endrin	Residue of banned insecticide.
43. Epichlorohydrin	Discharge from industrial chemical factories; An impurity of some water treatment chemicals.
44. Ethylene dibromide	Discharge from petroleum refineries.
45. Glyphosate	Runoff from herbicide use.
46. Heptachlor	Residue of banned termiticide.
47. Heptachlor epoxide	Breakdown of heptachlor.
48. Hexachlorobenzene	Discharge from metal refineries and agricultural chemical factories.
49. Hexachlorocyclopentadiene	Discharge from chemical factories.
50. Lindane	Runoff/leaching from insecticide used on cattle, lumber, gardens.
51. Methoxychlor	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock.
52. Oxamyl [Vydate]	Runoff/leaching from insecticide used on apples, potatoes and tomatoes.
53. PCBs [Polychlorinated biphenyls]	Runoff from landfills; Discharge of waste chemicals.
54. Pentachlorophenol	Discharge from wood preserving factories.
55. Picloram	Herbicide runoff.
56. Simazine	Herbicide runoff.
57. Toxaphene	Runoff/leaching from insecticide used on cotton and cattle.
Volatile Organic Contaminants	
58. Benzene	Discharge from factories; Leaching from gas storage tanks and landfills.
59. Bromate	Byproduct of drinking water disinfection.
60. Carbon tetrachloride	Discharge from chemical plants and other industrial activities.
61. Chloramines	Water additive used to control microbes.
62. Chlorine	Water additive used to control microbes.
63. Chlorite	Byproduct of drinking water disinfection.
64. Chlorine dioxide	Water additive used to control microbes.
65. Chlorobenzene	Discharge from chemical and agricultural chemical factories.
66. o-Dichlorobenzene	Discharge from industrial chemical factories.
67. p-Dichlorobenzene	Discharge from industrial chemical factories.
68. 1,2-Dichloroethane	Discharge from industrial chemical factories.
69. 1,1-Dichloroethylene	Discharge from industrial chemical factories.
70. cis-1,2-Dichloroethylene	Discharge from industrial chemical factories.
71. trans-1,2-Dichloroethylene	Discharge from industrial chemical factories.
72. Dichloromethane	Discharge from pharmaceutical and chemical factories.
73. 1,2-Dichloropropane	Discharge from industrial chemical factories.

74. Ethylbenzene	Discharge from petroleum refineries.
75. Haloacetic acids	By-product of drinking water disinfection.
76. Methyl *tert* Butyl Ether (MTBE)	Discharge from petroleum refineries; Leaching from gas storage tanks.
77. Styrene	Discharge from rubber and plastic factories; Leaching from landfills.
78. Tetrachloroethylene	Discharge from factories and dry cleaners.
79. 1,2,4-Trichlorobenzene	Discharge from textile- finishing factories.
80. 1,1,1-Trichloroethane	Discharge from metal degreasing sites and other factories.
81. 1,1,2-Trichloroethane	Discharge from industrial chemical factories.
82. Trichloroethylene	Discharge from metal degreasing sites and other factories.
83. TTHMs [Total trihalomethanes]	By-product of drinking water disinfection.
84. Toluene	Discharge from petroleum factories.
85. Vinyl Chloride	Leaching from PVC piping; Discharge from plastics factories.
86. Xylenes	Discharge from petroleum factories; Discharge from chemical factories.

4.4 Record Maintenance:

4.4.1 Retaining Records:

4.4.1.1 Effective upon the adoption of these Regulations, any owner of a PWS shall accumulate and make available to the Division within the time stated the following records which shall be retained on the premises or at a convenient location:

4.4.1.1.1 Records of microbiological analyses and turbidity analyses made pursuant to these regulations shall be kept for not less than five (5) years.

4.4.1.1.2 Chemical analyses records for not less than ten (10) years.

4.4.1.1.3 Actual laboratory reports may be kept, or data may be transferred to tabular summaries, or scanned copies of results, provided that the following information is included:

4.4.1.1.3.1 The date, place and time of sampling and the name of the person who collected the sample;

4.4.1.1.3.2 Identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample;

4.4.1.1.3.3 Date of analysis;

4.4.1.1.3.4 Laboratory and person responsible for performing analysis;

4.4.1.1.3.5 The analytical technique/method used and;

4.4.1.1.3.6 The results of the analysis.

4.4.1.1.4 Records of action taken by the system to correct violations of PMCL regulations shall be kept for a period not less than three (3) years after the last action taken with respect to the particular violation involved.

4.4.1.1.5 Reports, summaries and communications relating to sanitary surveys shall be kept for a period not less than ten (10) years after completion of the sanitary survey of the system conducted by the system itself, by a private consultant or by any local, State or Federal agency.

4.4.1.1.6 Copies of monitoring plans developed pursuant to these regulations shall be kept for the same period of time as the records of analyses taken under the plan are required to be kept under subsection 4.4.1.1.1 except as specified elsewhere in this part.

4.4.1.1.7 Copies of Public Notices, Consumer Confidence Reports, the certifications for each, and any decisions by the Division relating to the Public Notice shall be kept for five (5) years.

4.4.1.1.8 Any decisions made pursuant to the provisions of subsections 8.8 and 8.9.

4.4.1.1.8.1 IDSE monitoring plans, plus any modifications required by the Division, must be kept until replaced by approved IDSE reports.

4.4.1.1.8.2 IDSE reports and 40/30 certifications, plus any modifications required by the Division, must be kept until replace or revised in their entirety.

4.4.1.1.8.3 Operational evaluations submitted by a system must be kept for 10 years following submission.

4.4.2 Records Kept by Division:

4.4.2.1 Records of microbiological analyses of repeat or special samples shall be retained for not less than one (1) year in the form of actual laboratory reports or in an appropriate summary form. Records of each of the following decisions made pursuant to the total coliform provisions shall be made in writing and retained by the Division.

4.4.2.1.1 Records of the following decisions must be retained for five (5) years:

4.4.2.1.1.1 Any decision to waive the twenty-four (24) hour time limit for collecting repeat samples after a total coliform positive routine sample if the public water system has a logistical problem in collecting the repeat sample that is beyond the system's control, and what alternative time limit the system must meet.

4.4.2.1.1.2 Any decision to allow a system to waive the requirement for five (5) routine samples the month following a total coliform-positive sample. If the waiver decision is made, the record of the decision must contain all items listed in that paragraph.

4.4.2.1.1.3 Any decision to invalidate a total coliform-positive sample. If the decision to invalidate a total coliform positive sample is made, the record of the decision must contain all the items in that paragraph.

4.4.2.1.2 Records of each of the following decisions must be retained in such a manner so that each system's current status may be determined:

4.4.2.1.2.1 Any decision to reduce the total coliform monitoring frequency for a CWS serving one thousand (1000) persons or fewer, that has no history of total coliform contamination in its current configuration and had a sanitary survey conducted within the last five (5) years showing that the system is supplied solely by a protected ground water source and is free of sanitary defects, to less than once per month and what the reduced monitoring frequency is. A copy of the reduced monitoring frequency must be provided to the system.

4.4.2.1.2.2 Any decision to reduce the total coliform monitoring frequency for a NCWS using only ground water and serving one thousand (1000) persons or fewer to less than once per quarter, and what the reduced monitoring frequency is. A copy of the reduced monitoring frequency must be provided to the system.

4.4.2.1.2.3 Any decision to reduce the total coliform monitoring frequency for a NCWS using only ground water and serving more than one thousand (1000) persons during any month the system serves one thousand (1000) persons or fewer. A copy of the reduced monitoring frequency must be provided to the system.

4.4.2.1.2.4 Any decision to waive the twenty-four hour limit for taking a total coliform sample for a PWS which uses surface water, or ground water under the influence of surface water, and which does not practice filtration, and which measures a source water turbidity level exceeding one (1) NTU near the first service connection.

4.4.2.1.2.5 Any decision that a NCWS is using only protected and disinfected ground water and therefore may reduce the frequency of its sanitary survey to less than once every five (5) years and what that frequency is. A copy of the reduced frequency must be provided to the system.

4.4.2.1.2.6 A list of agents other than the Division, if any, approved by the Division to conduct sanitary surveys.

4.4.2.1.2.7 Any decision to allow a PWS to forgo fecal coliform or E. coli testing on a total coliform positive sample if that system assumes that the total coliform positive sample is fecal coliform positive or E. coli positive.

17 DE Reg. 439 (10/01/13)

5.0 Microbiological Requirements

5.1 Sampling:

5.1.1 Sampling Sites:

5.1.1.1 Compliance with bacteriological requirements of these Regulations shall be based on examinations of samples collected at sites which are representative of water throughout the distribution system according to a written sample siting plan. These plans are subject to Division review and revision.

5.1.2 CWS Sampling Frequency:

5.1.1.2 The supplier of water for a CWS shall sample for total coliform bacteria at least monthly in numbers proportional to the population served by the system in accordance with the following:

Population Served	**Number of Samples Per Month**
25-1,000	1
1,001-2,500	2
2,501-3,300	3
3,301-4,100	4
4,101-4,900	5
4,901-5,800	6
5,801-6,700	7
6,701-7,600	8
7,601-8,500	9
8,501-12,900	10
12,901-17,200	15
17,201-21,500	20
21,501-25,000	25
25,001-33,000	30
33,001-41,000	40
41,001-50,000	50
50,001-59,000	60
59,001-70,000	70
70,001-83,000	80
83,001-96,000	90
96,001-130,000	100
130,001-220,000	120

5.1.3 Reduced Monitoring Frequency for CWSs:

5.1.3.1 If a CWS serving twenty-five (25) to one thousand (1000) persons has no history of total coliform contamination in its current configuration and a sanitary survey conducted in the past five (5) years shows that the system is supplied solely by a protected ground water source and is free of sanitary defects, the Division may reduce the monitoring frequency specified above, except that in no case may the Division reduce the monitoring frequency to less than one (1) sample per quarter. The Division must approve the reduced monitoring frequency in writing.

5.1.4 NCWS Sampling Frequency:

5.1.4.1 The supplier of water for a NCWS and NTNCWS shall sample for total coliform bacteria in accordance with the following:

5.1.4.1.1 A NCWS and NTNCWS using only ground water (except ground water under the direct influence of surface water) and serving one thousand (1000) persons or fewer must monitor each calendar quarter that the system provides water to the public, except that the Division may reduce this monitoring frequency, in writing, if a sanitary survey shows that the system is free of sanitary defects. Beginning June 29, 1994 the Division cannot reduce the monitoring frequency for a NCWS using only ground water (except ground water under the direct influence of surface water) and serving one thousand (1000) persons or fewer to less than once per year.

5.1.4.1.2 A NCWS and NTNCWS using only ground water (except ground water under the direct influence of surface water) and serving more than one thousand (1000) persons during any month must monitor at the same frequency as a like-sized CWS, as specified in section 5.1.2,

except the Division may reduce this monitoring frequency, in writing, for any month the system serves one thousand (1000) persons or fewer. The Division cannot reduce the monitoring frequency to less than once per year. For systems using ground water under the direct influence of surface water, subsection 5.1.4.1.4 applies.

5.1.4.1.3 A NCWS and NTNCWS using surface water, in total or in part, must monitor at the same frequency as a like-sized CWS, as specified in subsection 5.1.2, regardless of the number of persons it serves.

5.1.4.1.4 A NCWS and NTNCWS using ground water under the direct influence of surface water must monitor at the same frequency as a like-sized CWS, as specified in subsection 5.1.2. The system must begin monitoring at this frequency beginning six (6) months after the Division determines that the ground water is under the direct influence of surface water.

5.1.5 Special Sampling for Surface Water Systems: A PWS that uses surface water or ground water under the direct influence of surface water, and does not practice filtration in compliance with section 1.1, must collect at least one (1) sample near the first service connection each day the turbidity level of the source water, measured as specified in subsection 7.1.2, exceeds one (1) NTU. This sample must be analyzed for the presence of total coliforms. When one (1) or more turbidity measurements in any day exceed one (1) NTU, the system must collect this coliform sample within twenty-four (24) hours of the first exceedance, unless the Division determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within thirty (30) hours of collection. Sample results from this coliform monitoring must be included in determining the MCL for total coliforms.

5.1.6 Monthly/Quarterly Sampling: The PWS must collect samples at regular time intervals throughout the month/quarter, except that a system that uses only ground water (except ground water under the direct influence of surface water) and serves 4,900 persons or fewer, may collect all required samples on a single day if they are taken from different sites.

5.1.7 Special Purpose Samples: Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for total coliforms. Repeat samples taken pursuant to subsection 5.2.3 are not considered special purpose samples, and must be used to determine compliance with the MCL for total coliforms.

5.2 Microbiological MCLs

5.2.1 Total Coliforms, Fecal Coliforms and *E. coli*:

5.2.1.1 The MCLs for microbiological contaminants are in accordance with the following:

5.2.1.1.1 When any approved analytical methodology from subsection 5.3 is used, compliance with the MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density in accordance with the following:

5.2.1.1.1.1 For a system which collects at least forty (40) samples per month/quarter, if no more than 5.0 percent of the samples collected during a month/quarter are total coliform-positive, the system is in compliance with the MCL for total coliforms.

5.2.1.1.1.2 For a system which collects fewer than forty (40) samples per month/quarter, if no more than one (1) sample collected during a month/quarter is total coliform-positive, the system is in compliance with the MCL for total coliforms.

5.2.1.1.2 Any fecal coliform-positive repeat sample, or *E. coli*-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or *E. coli*-positive routine sample constitutes a violation of the MCL for total coliforms. For purposes of the public notification requirements in subsection 4.2, this is a violation that may pose an acute risk to health.

5.2.1.1.3 A PWS must determine compliance with the MCL for total coliforms in accordance with the above for each month/quarter in which it is required to monitor for total coliforms.

5.2.1.1.4 The Division hereby identifies the following as the BAT, treatment techniques, or other means available for achieving compliance with the MCL for total coliforms above:

5.2.1.1.4.1 Protection of wells from contamination by coliforms by appropriate placement and construction;

5.2.1.1.4.2 Maintenance of a disinfectant residual throughout the distribution system;

5.2.1.1.4.3 Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, and continual maintenance of positive water pressure in all parts of the distribution system;

5.2.1.1.4.4 Filtration and/or disinfection of surface water, or disinfection of ground water using strong oxidants such as chlorine, chlorine dioxide, or ozone.

5.2.1.1.4.5 The development of an EPA-approved State Wellhead Protection Program under section 1428 of the Safe Drinking Water Act (SDWA).

5.2.2 Invalidation of Total Coliform-Positive Samples:

5.2.2.1 Each total coliform positive sample counts in compliance calculations, unless it has been invalidated by the Division. Invalidated samples do not count toward the minimum monitoring frequency. The Division may invalidate a sample if:

5.2.2.1.1 The analytical laboratory acknowledges that improper sample analysis caused the positive result;

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

5.2.2.1.3 The Division determines that the contamination is a domestic or other non-distribution system plumbing problem on the basis that one (1) or more repeat samples taken at the same tap as the original total coliform-positive sample is total coliform-positive, but all repeat samples at nearby sampling locations that are within five (5) service connections of the original tap are total coliform-negative. A total coliform-positive sample cannot be invalidated under this provision if the PWS has only one (1) service connection; or

5.2.2.1.4 The Division has substantial grounds to believe that a total coliform positive result is due to some circumstance or condition which does not reflect water quality in the distribution system, if:

5.2.2.1.4.1 The basis for this determination is documented in writing.

5.2.2.1.4.2 This document is signed and approved by the Division.

5.2.2.1.4.3 The documentation is made available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take, to correct this problem.

5.2.2.1.4.4 The system must still collect all repeat samples required under subsection 5.2.3 to determine compliance with the MCL for total coliforms in subsection 5.2.1.

5.2.3 Repeat Monitoring:

5.2.3.1 When a total coliform-positive sample result is obtained, repeat sampling must be done in accordance with the following:

5.2.3.1.1 If a routine sample is total-coliform positive, the PWS must collect a set of repeat samples within twenty-four (24) hours of being notified of the positive result. A system which collects more than one (1) routine sample/month must collect no fewer than three (3) repeat samples for each total coliform positive sample found. A system which collects one (1) routine sample/month or fewer must collect no fewer than four (4) repeat samples for each total coliform positive sample found. The Division may extend the twenty-four (24) hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within twenty-four hours that is beyond its control. In the case of an extension, the Division must specify how much time the system has to collect the repeat samples.

5.2.3.1.2 The system must collect at least one (1) repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one (1) repeat sample at a tap within five (5) service connections upstream and at least one (1) repeat sample at a tap within five (5) service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the distribution system, or one (1) away from the end of the distribution system, the Division may waive the requirement to collect at least one (1) repeat sample upstream or downstream of the original sampling site.

5.2.3.1.3 The system must collect all repeat samples on the same day, except that the Division may allow a system with a single service connection to collect the required set of repeat samples over a four (4) day period or to collect a larger volume repeat sample(s) in one (1) or more sample containers of any size, as long as the total volume collected is at least four hundred (400) ml [three hundred (300) ml for systems which collect more than one (1) routine sample/ month].

5.2.3.1.4 If one (1) or more repeat samples in the set is total coliform-positive, the PWS must collect an additional set of repeat samples in the manner specified in subsections 5.2.1, 5.2.2, and 5.2.3. The additional samples must be collected within twenty-four (24) hours of being notified of the positive result, unless the Division extends the limit as provided in subsection 5.2.1. The system must repeat this process until either total coliforms are not detected in one (1) complete set of repeat samples or the system determines that the MCL for total coliforms in section 5.2.1 has been exceeded and notifies the Division.

5.2.3.1.5 If a system collecting fewer than five (5) routine samples per month has one (1) or more total coliform-positive samples and the Division does not invalidate the sample(s) under section 5.2.2, it must collect at least five (5) routine samples during the next month the system provides water to the public, except that the Division may waive this requirement if the conditions of subsections 5.2.3.1.5.1 and 5.2.3.1.5.2 are met. The Division cannot waive the requirement for a system to collect repeat samples in subsections 5.2.3.1.1, 5.2.3.1.2, 5.2.3.1.3, and 5.2.3.1.4.

5.2.3.1.5.1 The Division may waive the requirements to collect five (5) routine samples the next month the system provides water to the public if the Division, or an agent approved by the Division, performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Division to determine whether additional monitoring and/or any corrective action is needed. The Division cannot approve an employee of the system to perform the site visit, even if the employee is an agent approved by the Division to perform sanitary surveys.

5.2.3.1.5.2 The Division may waive the requirements to collect five (5) routine samples the next month the system provides water to the public if the Division has determined why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. In this case, the Division must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the Division official who recommends such a decision, and make this document available to the EPA and the public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem. The Division cannot waive the requirement to collect five (5) routine samples the next month the system provides water to the public solely on the grounds that all coliform samples are total coliform-negative. Under this paragraph, a system must still take at least one (1) routine sample before the end of the next month it serves water to the public and use it to determine compliance with the MCL for total coliforms in section 5.2.1, unless the Division has determined that the system has corrected the contamination problem before the system took the set of repeat samples required in subsections 5.2.3.1.1, 5.2.3.1.2, 5.2.3.1.3, and 5.2.3.1.4, and all repeat samples were total coliform negative.

5.2.3.1.6 After a systems collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five (5) adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the system may count the subsequent sample(s) as a repeat sample instead of a routine sample.

5.2.3.1.7 Results of all routine and repeat samples not invalidated by the Division must be included in determining compliance with the MCL for total coliforms in subsection 5.2.1.

5.2.4 Initial/Subsequent Sanitary Surveys: PWSs which do not collect five (5) or more routine samples/month must undergo an initial sanitary survey by June 29, 1994 for CWSs and June 29, 1999 for NCWSs. Thereafter, systems must undergo another sanitary survey every five (5) years, except that NCWSs using only protected and disinfected ground water, as defined by the Division, must undergo subsequent sanitary surveys at least every ten (10) years after the initial sanitary survey. The Division must review the results of each sanitary survey to determine whether the existing monitoring frequency is adequate and what additional measures, if any, the system needs to undertake to improve drinking water quality. In conducting a sanitary survey of a system using ground water in a State having an EPA-approved wellhead

protection program under section 1428 of the SDWA, information on sources of contamination within the delineated wellhead protection area that was collected in the course of developing and implementing the program should be considered instead of collecting new information, if the information was collected since the last time the system was subject to a sanitary survey. Sanitary surveys must be performed by the Division and the system is responsible for ensuring the survey takes place.

5.2.5 Fecal Coliforms/*Escherichia coli* (*E. coli*) Testing:

5.2.5.1 When a total coliform-positive sample result is obtained, the sample must be analyzed for fecal coliforms or *E. coli* in accordance with the following:

5.2.5.1.1 If any routine or repeat sample is total coliform- positive, the system must analyze that total coliform-positive culture medium to determine if fecal coliforms are present, except that the system may test for *E. coli* in lieu of fecal coliforms. If fecal coliforms or *E. coli* are present, the system shall notify the Division by the end of the day when the system is notified of the test result, unless the system is notified of the result after the Division office is closed, in which case the system shall notify the Division before the end of the next business day.

5.2.5.1.2 The Division has the discretion to allow the PWS, on a case by case basis, to forgo fecal coliform or *E. coli* testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is fecal coliform-positive or *E. coli* positive. Accordingly, the system shall notify the Division as specified in subsection 5.2.1.1.1 and the provisions of section 5.2.1.1.2 apply.

5.2.6 Response to Violation. A PWS which has exceeded the MCL for total coliforms in subsection 5.2.1 must report the violation to the Division no later than the end of the next business day after it learns of the violation, and notify the public in accordance with subsection 4.1. A PWS which has failed to comply with a coliform monitoring requirement, including the sanitary survey requirement, must report the monitoring violation to the Division within ten (10) days after the system discovers the violation, and notify the public in accordance with subsection 4.1.

5.3 Analytical Requirements. Analytical Methodology. The standard sample volume required for total coliform analysis, regardless of analytical method used, is one hundred (100) ml. Public water systems need only determine the presence or absence of total coliforms. A determination of total coliform density is not required. Public water systems must conduct total coliform analyses in accordance with 40 CFR 141.21(f)(3). Copies may be obtained from the Office of Drinking Water.

5.4 Ground Water Rule

5.4.1 General requirements and applicability

5.4.1.1 Scope of this section. The requirements of this subpart S constitute National Primary Drinking Water Regulations.

5.4.1.2 Applicability. This section applies to all public water systems that use ground water except that it does not apply to public water systems that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment under subpart H. For the purposes of this section, “ground water system” is defined as any public water system meeting this applicability statement, including consecutive systems receiving finished ground water.

5.4.1.3 General requirements. Systems subject to this section must comply with the following requirements:

5.4.1.3.1 Sanitary survey information requirements for all ground water systems as described in subsection 5.4.2.

5.4.1.3.2 Microbial source water monitoring requirements for ground water systems that do not treat all of their ground water to at least 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer as described in subsection 5.4.3.

5.4.1.3.3 Treatment technique requirements, described in subsection 5.4.4, that apply to ground water systems that have fecally contaminated source waters, as determined by source water monitoring conducted under subsection 5.4.3, or that have significant deficiencies that are identified by the Division or that are identified by EPA under SDWA section 1445. A ground water system with fecally contaminated source water or with significant deficiencies subject to the treatment technique requirements of this section must implement one or more of the following corrective action options: correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably

achieves at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer.

5.4.1.3.4 Ground water systems that provide at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer are required to conduct compliance monitoring to demonstrate treatment effectiveness, as described in subsection 5.4.4.2.

5.4.1.3.5 If requested by the Division, ground water systems must provide the Division with any existing information that will enable the State to perform a hydrogeologic sensitivity assessment. For the purposes of this section, "hydrogeologic sensitivity assessment" is a determination of whether ground water systems obtain water from hydrogeologically sensitive settings.

5.4.1.4 Compliance date. Ground water systems must comply, unless otherwise noted, with the requirements of this section beginning December 1, 2009.

5.4.2 Sanitary surveys for ground water systems.

5.4.2.1 Ground water systems must provide the Division, at the Division's request, any existing information that will enable the Division to conduct a sanitary survey.

5.4.2.2 For the purposes of this section, a "sanitary survey," as conducted by the Division, includes but is not limited to, an onsite review of the water source(s) (identifying sources of contamination by using results of source water assessments or other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system to evaluate the adequacy of the system, its sources and operations and the distribution of safe drinking water.

5.4.2.3 The sanitary survey must include an evaluation of the applicable components listed in subsections 5.4.2.3.1 through 5.4.2.3.8:

5.4.2.3.1 Source,

5.4.2.3.2 Treatment,

5.4.2.3.3 Distribution system,

5.4.2.3.4 Finished water storage,

5.4.2.3.5 Pumps, pump facilities, and controls,

5.4.2.3.6 Monitoring, reporting, and data verification,

5.4.2.3.7 System management and operation, and

5.4.2.3.8 Operator compliance with State requirements.

5.4.3 Ground water source microbial monitoring and analytical methods.

5.4.3.1 Triggered source water monitoring.

5.4.3.1.1 General requirements. A ground water system must conduct triggered source water monitoring if the conditions identified in subsections 5.4.3.1.1.1 and 5.4.3.1.1.2 exist.

5.4.3.1.1.1 The system does not provide at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for each ground water source; and

5.4.3.1.1.2 The system is notified that a sample collected under subsection 5.1 is total coliform-positive and the sample is not invalidated under subsection 5.2.2.

5.4.3.1.2 Sampling Requirements. A ground water system must collect, within 24 hours of notification of the total coliform-positive sample, at least one ground water source sample from each ground water source in use at the time the total coliform-positive sample was collected under subsection 5.1, except as provided in subsection 5.4.3.1.2.2.

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

5.4.3.1.2.2 If approved by the Division, systems with more than one ground water source may meet the requirements of subsection 5.4.3.1.2 by sampling a representative ground water source or sources. If directed by the Division, systems must submit for Division approval a triggered source water monitoring plan that identifies one or more ground water sources that are representative of each monitoring site in the system's sample siting plan under subsection 5.1 and that the system intends to use for representative sampling under this paragraph.

5.4.3.1.2.3 A ground water system serving 1,000 people or fewer may use a repeat sample collected from a ground water source to meet both the requirements of subsection 5.2.3 and to satisfy

the monitoring requirements of subsection 5.4.3.1.2 for that ground water source only if the Division approves the use of E. coli as a fecal indicator for source water monitoring under subsection 5.4.3.1. If the repeat sample collected from the ground water source is E. coli positive, the system must comply with subsection 5.4.3.1.3.

5.4.3.1.3 Additional Requirements. If the Division does not require corrective action under subsection 5.4.4.1.2 for a fecal indicator-positive source water sample collected under subsection 5.4.3.1.2 that is not invalidated under subsection 5.4.3.4, the system must collect five additional source water samples from the same source within 24 hours of being notified of the fecal indicator-positive sample.

5.4.3.1.4 Consecutive and Wholesale Systems.

5.4.3.1.4.1 In addition to the other requirements of subsection 5.4.3.1, a consecutive ground water system that has a total coliform-positive sample collected under section 5.1 must notify the wholesale system(s) within 24 hours of being notified of the total coliform-positive sample.

5.4.3.1.4.2 In addition to the other requirements of subsection 5.4.3.1, a wholesale ground water system must comply with subsections 5.4.3.1.4.2.1 and 5.4.3.1.4.2.2.

5.4.3.1.4.2.1 A wholesale ground water system that receives notice from a consecutive system it serves that a sample collected under subsection 5.1 is total coliform-positive must, within 24 hours of being notified, collect a sample from its ground water source(s) under subsection 5.4.3.1.2 and analyze it for a fecal indicator under subsection 5.4.3.3.

5.4.3.1.4.2.2 If the sample collected under subsection 5.4.3.1.4.2.1 is fecal indicator-positive, the wholesale ground water system must notify all consecutive systems served by that ground water source of the fecal indicator source water positive within 24 hours of being notified of the ground water source sample monitoring result and must meet the requirements of subsection 5.4.3.1.3.

5.4.3.1.5 Exceptions to the Triggered Source Water Monitoring Requirements. A ground water system is not required to comply with the source water monitoring requirements of subsection 5.4.3.1 if either of the following conditions exists:

5.4.3.1.5.1 The Division determines, and documents in writing, that the total coliform-positive sample collected under subsection 5.1 is caused by a distribution system deficiency; or

5.4.3.1.5.2 The total coliform-positive sample collected under subsection 5.1 is collected at a location that meets State criteria for distribution system conditions that will cause total coliform-positive samples.

5.4.3.2 Assessment Source Water Monitoring. If directed by the Division, ground water systems must conduct assessment source water monitoring that meets State-determined requirements for such monitoring. A ground water system conducting assessment source water monitoring may use a triggered source water sample collected under subsection 5.4.3.1.2 to meet the requirements of subsection 5.4.3.2. Division-determined assessment source water monitoring requirements may include:

5.4.3.2.1 Collection of a total of 12 ground water source samples that represent each month the system provides ground water to the public,

5.4.3.2.2 Collection of samples from each well unless the system obtains written Division approval to conduct monitoring at one or more wells within the ground water system that are representative of multiple wells used by that system and that draw water from the same hydrogeologic setting,

5.4.3.2.3 Collection of a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used,

5.4.3.2.4 Analysis of all ground water source samples using one of the analytical methods listed in the in subsection 5.4.3.3.2 for the presence of E. coli, enterococci, or coliphage,

5.4.3.2.5 Collection of ground water source samples at a location prior to any treatment of the ground water source unless the Division approves a sampling location after treatment, and

5.4.3.2.6 Collection of ground water source samples at the well itself unless the system's configuration does not allow for sampling at the well itself and the Division approves an alternate sampling location that is representative of the water quality of that well.

5.4.3.3 Analytical methods.

5.4.3.3.1 A ground water system subject to the source water monitoring requirements of subsection 5.4.3.1 must collect a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used.

5.4.3.3.2 A ground water system must analyze all ground water source samples collected under subsection 5.4.3.1 using one of the analytical methods listed in the following table for the presence of E. coli, enterococci, or coliphage:

Analytical Methods for Source Water Monitoring

Fecal Indicator[1]	Methodology	Method Citation
E. coli	Colilert[3] Colisure[3] Membrane Filter Method with MI Agar m-Coliblue24 Test[5] E*Colite Test[6] EC-MUG[7] NA-MUG[7]	9223 B.[2] 9223 B.[2] EPA Method 1604[4] 9221 F.[2] 9222 G.[2]
Enterococci	Multiple Tube Technique Membrane Filter Technique Membrane Filter Technique Enterolert[9]	9230B.[2] 9230C.[2] EPA Method 1600[8]
Coliphage	Two-Step Enrichment Presence-Absence Procedure Single Agar Layer Procedure	EPA Method 1601.[10] EPA Method 1602.[11]

Analyses must be conducted in accordance with the documents listed below. The Director of the Federal Register approves the incorporation by reference of the documents listed in footnotes 2-11 in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Copies may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington DC 20460 (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741- 6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

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

[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 at http://www.epa.gov/nerlcwww/1604sp02.pdf or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

[5] A description of the m-ColiBlue24 Test, "Total Coliforms and E. coli Membrane Filtration Method with m-ColiBlue24[reg] Broth, "Method No. 10029 Revision 2, August 17, 1999, is available from Hach Company, 100 Dayton Ave., Ames, IA 50010 or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

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

[7] EC-MUG (Method 9221F) or NA-MUG (Method 9222G) can be used for E. coli testing step as described in Sec. 141.21(f)(6)(i) or (ii) after use of Standard Methods 9221 B, 9221 D, 9222 B, or 9222 C.

[8] EPA Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl-[beta]-D-Glucoside Agar (mEI) EPA 821-R- 02-022 (September 2002) is an approved variation of Standard Method 9230C. The method is available at http://www.epa.gov/nerlcwww/1600sp02.pdf or from EPA's Water Resource

Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460. The holding time and temperature for ground water samples are specified in footnote 1 above, rather than as specified in section 8 of EPA Method 1600.

[9] 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.

[10] EPA Method 1601: Male-specific (F+) and Somatic Coliphage in Water by Two-step Enrichment Procedure; April 2001, EPA 821-R-01-030. Method is available at http://www.epa.gov/nerlcwww/1601ap01.pdf or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

[11] EPA Method 1602: Male-specific (F+) and Somatic Coliphage in Water by Single Agar Layer (SAL) Procedure; April 2001, EPA 821-R-01-029. Method is available at http://www.epa.gov/nerlcwww/1602ap01.pdf or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

5.4.3.4 Invalidation of a fecal indicator-positive ground water source sample.

5.4.3.4.1 A ground water system may obtain Division invalidation of a fecal indicator-positive ground water source sample collected under subsection 5.4.3.1 only under the conditions specified in subsection 5.4.3.4.1.1 and 5.4.3.4.1.2.

5.4.3.4.1.1 The system provides the Division with written notice from the laboratory that improper sample analysis occurred; or

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

5.4.3.4.2 If the Division invalidates a fecal indicator-positive ground water source sample, the ground water system must collect another source water sample under subsection 5.4.3.1 within 24 hours of being notified by the Division of its invalidation decision and have it analyzed for the same fecal indicator using the analytical methods in section 5.4.3.3. The Division may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the Division must specify how much time the system has to collect the sample.

5.4.3.5 Sampling location.

5.4.3.5.1 Any ground water source sample required under section 5.4.3.1 must be collected at a location prior to any treatment of the ground water source unless the State approves a sampling location after treatment.

5.4.3.5.2 If the system's configuration does not allow for sampling at the well itself, the system may collect a sample at a Division-approved location to meet the requirements of section 5.4.3.1 if the sample is representative of the water quality of that well.

5.4.3.6 New Sources. If directed by the Division, a ground water system that places a new ground water source into service after November 30, 2009, must conduct assessment source water monitoring under subsection 5.4.3.2. If directed by the Division, the system must begin monitoring before the ground water source is used to provide water to the public.

5.4.3.7 Public Notification. A ground water system with a ground water source sample collected under subsections 5.4.3.1 or 5.4.3.2 that is fecal indicator-positive and that is not invalidated under subsection 5.4.3.4, including consecutive systems served by the ground water source, must conduct public notification under subsection 4.2.1.1.1.

5.4.3.8 Monitoring Violations. Failure to meet the requirements of subsections 5.4.3.1 – 5.4.3.6 is a monitoring violation and requires the ground water system to provide public notification under subsection 4.2.1.1.3.

5.4.4 Treatment technique requirements for ground water systems.

5.4.4.1 Ground water systems with significant deficiencies or source water fecal contamination.

5.4.4.1.1 The treatment technique requirements of this section must be met by ground water systems when a significant deficiency is identified or when a ground water source sample collected under subsection 5.4.3.1.3 is fecal indicator-positive.

5.4.4.1.2 If directed by the Division, a ground water system with a ground water source sample collected under subsection 5.4.3.1.2, subsection 5.4.3.1.4, or subsection 5.4.3.2 that is fecal indicator-positive must comply with the treatment technique requirements of this section.

5.4.4.1.3 When a significant deficiency is identified at a Subpart H public water system that uses both ground water and surface water or ground water under the direct influence of surface water, the system must comply with provisions of this paragraph except in cases where the Division determines that the significant deficiency is in a portion of the distribution system that is served solely by surface water or ground water under the direct influence of surface water.

5.4.4.1.4 Unless the Division directs the ground water system to implement a specific corrective action, the ground water system must consult with the Division regarding the appropriate corrective action within 30 days of receiving written notice from the Division of a significant deficiency, written notice from a laboratory that a ground water source sample collected under subsection 5.4.3.1.3 was found to be fecal indicator-positive, or direction from the Division that a fecal indicator-positive collected under subsection 5.4.3.1.2, subsection 5.4.3.1.4, or subsection 5.4.3.2 requires corrective action. For the purposes of this section, significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the Division determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

5.4.4.1.5 Within 120 days (or earlier if directed by the Division) of receiving written notification from the Division of a significant deficiency, written notice from a laboratory that a ground water source sample collected under subsection 5.4.3.1.3 was found to be fecal indicator-positive, or direction from the Division that a fecal indicator-positive sample collected under subsection 5.4.3.1.2, subsection 5.4.3.1.4, or subsection 5.4.3.2 requires corrective action, the ground water system must either:

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

5.4.4.1.5.2 Be in compliance with a Division-approved corrective action plan and schedule subject to the conditions specified in subsections 5.4.4.1.5.2.1 and 5.4.4.1.5.2.2.

5.4.4.1.5.2.1 Any subsequent modifications to a Division-approved corrective action plan and schedule must also be approved by the Division.

5.4.4.1.5.2.2 If the Division specifies interim measures for protection of the public health pending Division approval of the corrective action plan and schedule or pending completion of the corrective action plan, the system must comply with these interim measures as well as with any schedule specified by the Division.

5.4.4.1.6 Corrective Action Alternatives. Ground water systems that meet the conditions of subsections 5.4.4.1.1 or 5.4.4.1.2 must implement one or more of the following corrective action alternatives:

5.4.4.1.6.1 Correct all significant deficiencies;

5.4.4.1.6.2 Provide an alternate source of water;

5.4.4.1.6.3 Eliminate the source of contamination; or

5.4.4.1.6.4 Provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

5.4.4.1.7 Special notice to the public of significant deficiencies or source water fecal contamination.

5.4.4.1.7.1 In addition to the applicable public notification requirements of subsection 4.2.1.1.1, a community ground water system that receives notice from the Division of a significant deficiency or notification of a fecal indicator-positive ground water source sample that is not invalidated by the Division under subsection 5.4.3.4 must inform the public served by the water system under subsection 4.3.3.8.6 of the fecal indicator-positive source sample or of any significant deficiency that has not been corrected. The system must continue to inform the public annually until the significant deficiency is corrected or the fecal contamination in the ground water source is determined by the Division to be corrected under subsection 5.4.4.1.5.

5.4.4.1.7.2 In addition to the applicable public notification requirements of subsection 4.2.1.1.1, a non-community ground water system that receives notice from the Division of a significant deficiency must inform the public served by the water system in a manner approved by the Division of any significant deficiency that has not been corrected within 12 months of being notified by the Division, or earlier if directed by the Division. The system must continue to

inform the public annually until the significant deficiency is corrected. The information must include:

5.4.4.1.7.2.1 The nature of the significant deficiency and the date the significant deficiency was identified by the Division;

5.4.4.1.7.2.2 The Division-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed; and

5.4.4.1.7.2.3 For systems with a large proportion of non-English speaking consumers, as determined by the Division, information in the appropriate language(s) regarding the importance of the notice or a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.

5.4.4.1.7.3 If directed by the Division, a non-community water system with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how the deficiencies were corrected, and the dates of correction under subsection 5.4.4.1.7.2.

5.4.4.2 Compliance monitoring

5.4.4.2.1 Existing ground water sources. A ground water system that is not required to meet the source water monitoring requirements of this section for any ground water source because it provides at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for any ground water source before December 1, 2009, must notify the Division in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the specified ground water source and begin compliance monitoring in accordance with section 5.4.4.2.3 by December 1, 2009. Notification to the Division must include engineering, operational, or other information that the Division requests to evaluate the submission. If the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source, the system must conduct ground water source monitoring as required under section 5.4.3.

5.4.4.2.2 New ground water sources. A ground water system that places a ground water source in service after November 30, 2009, that is not required to meet the source water monitoring requirements of this section because the system provides at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source must comply with the requirements of subsections 5.4.4.2.2.1, 5.4.4.2.2.2 and 5.4.4.2.2.3.

5.4.4.2.2.1 The system must notify the Division in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source. Notification to the Division must include engineering, operational, or other information that the division requests to evaluate the submission.

5.4.4.2.2.2 The system must conduct compliance monitoring as required under subsection 5.4.4.2.3 within 30 days of placing the source in service.

5.4.4.2.2.3 The system must conduct ground water source monitoring under subsection 5.4.3 if the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

5.4.4.2.3 Monitoring requirements. A ground water system subject to the requirements of subsections 5.4.4.2.1, 5.4.4.2.2.1 or 5.4.4.2.2.2 must monitor the effectiveness and reliability of treatment for that ground water source before or at the first customer as follows:

5.4.4.2.3.1 Chemical disinfection

5.4.4.2.3.1.1 Ground water systems serving greater than 3,300 people. A ground water system that serves greater than 3,300 people must continuously monitor the residual disinfectant concentration using analytical methods specified in section 8.2.1 at a location approved by the Division and must record the lowest residual disinfectant concentration each day that water from the ground water source is served to the public. The ground water system must maintain the Division-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. If there is a failure

in the continuous monitoring equipment, the ground water system must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service. The system must resume continuous residual disinfectant monitoring within 14 days.

5.4.4.2.3.1.2 Ground water systems serving 3,300 or fewer people. A ground water system that serves 3,300 or fewer people must monitor the residual disinfectant concentration using analytical methods specified in section 8.2.1 at a location approved by the Division and record the residual disinfection concentration each day that water from the ground water source is served to the public. The ground water system must maintain the Division-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. The ground water system must take a daily grab sample during the hour of peak flow or at another time specified by the Division. If any daily grab sample measurement falls below the Division-determined residual disinfectant concentration, the ground water system must take follow-up samples every four hours until the residual disinfectant concentration is restored to the Division-determined level. Alternatively, a ground water system that serves 3,300 or fewer people may monitor continuously and meet the requirements of subsection 5.4.4.2.3.1.1.

5.4.4.2.3.2 Membrane filtration. A ground water system that uses membrane filtration to meet the requirements of this section must monitor the membrane filtration process in accordance with all Division-specified monitoring requirements and must operate the membrane filtration in accordance with all Division-specified compliance requirements. A ground water system that uses membrane filtration is in compliance with the requirement to achieve at least 4-log removal of viruses when:

5.4.4.2.3.2.1 The membrane has an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses;

5.4.4.2.3.2.2 The membrane process is operated in accordance with Division-specified compliance requirements; and

5.4.4.2.3.2.3 The integrity of the membrane is intact.

5.4.4.2.3.3 Alternative treatment. A ground water system that uses a Division-approved alternative treatment to meet the requirements of this section by providing at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer must:

5.4.4.2.3.3.1 Monitor the alternative treatment in accordance with all Division-specified monitoring requirements; and

5.4.4.2.3.3.2 Operate the alternative treatment in accordance with all compliance requirements that the Division determines to be necessary to achieve at least 4-log treatment of viruses.

5.4.4.3 Discontinuing treatment. A ground water system may discontinue 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source if the Division determines and documents in writing that 4-log treatment of viruses is no longer necessary for that ground water source. A system that discontinues 4-log treatment of viruses is subject to the source water monitoring and analytical methods requirements of subsection 5.4.3.

5.4.4.4 Failure to meet the monitoring requirements of subsection 5.4.4.2.1 is a monitoring violation and requires the ground water system to provide public notification under subsection 4.2.1.1.3.

5.4.5 Treatment technique violations for ground water systems.

5.4.5.1 A ground water system with a significant deficiency is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the Division) of receiving written notice from the Division of the significant deficiency, the system:

5.4.5.1.1 Does not complete corrective action in accordance with any applicable Division plan review processes or other Division guidance and direction, including Division specified interim actions and measures, or

5.4.5.1.2 Is not in compliance with a Division-approved corrective action plan and schedule.

5.4.5.2 Unless the Division invalidates a fecal indicator-positive ground water source sample under subsection 5.4.3.4, a ground water system is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the Division) of meeting the conditions of subsection 5.4.4.1.1 or subsection 5.4.4.1.2, the system:

5.4.5.2.1 Does not complete corrective action in accordance with any applicable Division plan review processes or other Division guidance and direction, including Division-specified interim measures, or

5.4.5.2.2 Is not in compliance with a Division-approved corrective action plan and schedule.

5.4.5.3 A ground water system subject to the requirements of subsection 5.4.4.2.3 that fails to maintain at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source is in violation of the treatment technique requirement if the failure is not corrected within four hours of determining the system is not maintaining at least 4-log treatment of viruses before or at the first customer.

5.4.5.4 Ground water system must give public notification under subsection 4.2.1.1.2 for the treatment technique violations specified in subsections 5.4.5.1, 5.4.5.2 and 5.4.5.3.

5.4.6 Reporting and recordkeeping for ground water systems.

5.4.6.1 Reporting. In addition to the requirements of section 4.1, a ground water system regulated under this section must provide the following information to the Division:

5.4.6.1.1 A ground water system conducting compliance monitoring under subsection 5.4.4.2 must notify the Division any time the system fails to meet any Division-specified requirements including, but not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within four hours. The ground water system must notify the Division as soon as possible, but in no case later than the end of the next business day.

5.4.6.1.2 After completing any corrective action under subsection 5.4.4.1, a ground water system must notify the Division within 30 days of completion of the corrective action.

5.4.6.1.3 If a ground water system subject to the requirements of subsection 5.4.3.1 does not conduct source water monitoring under subsection 5.4.3.1.5.3, the system must provide documentation to the Division within 30 days of the total coliform positive sample that it met the Division criteria.

5.4.6.2 Recordkeeping. In addition to the requirements of subsection 4.4, a ground water system regulated under this section must maintain the following information in its records:

5.4.6.2.1 Documentation of corrective actions. Documentation shall be kept for a period of not less than ten years.

5.4.6.2.2 Documentation of notice to the public as required under subsection 5.4.4.1.7. Documentation shall be kept for a period of not less than three years.

5.4.6.2.3 Records of decisions under subsection 5.4.3.1.5.2 and records of invalidation of fecal indicator-positive ground water source samples under subsection 5.4.3.4. Documentation shall be kept for a period of not less than five years.

5.4.6.2.4 For consecutive systems, documentation of notification to the wholesale system(s) of total-coliform positive samples that are not invalidated under subsection 5.2.2. Documentation shall be kept for a period of not less than five years.

5.4.6.2.5 For systems, including wholesale systems, that are required to perform compliance monitoring under subsection 5.4.4.2:

5.4.6.2.5.1 Records of the Division-specified minimum disinfectant residual. Documentation shall be kept for a period of not less than ten years.

5.4.6.2.5.2 Records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the Division-prescribed minimum residual disinfectant concentration for a period of more than four hours. Documentation shall be kept for a period of not less than five years.

5.4.6.2.5.3 Records of Division-specified compliance requirements for membrane filtration and of parameters specified by the Division for Division-approved alternative treatment and records of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four hours. Documentation shall be kept for a period of not less than five years.

6.0 Inorganic and Organic Chemical Requirements

6.1 Inorganic Chemical Requirements

6.1.1 PMCLs AND SMCLs: The following are the inorganic PMCLs and SMCLs (mg/L - milligrams per liter). Compliance is determined pursuant to subsection 6.1.2.

6.1.1.1 Table of PMCLs

PMCLs Substance	**MCL**
Antimony (Sb)	0.006 mg/L
Arsenic (As)**	0.010 mg/L
Asbestos	7 MF/L*
Barium (Ba)	2 mg/L
Beryllium (Be)	0.004 mg/L
Cadmium (Cd)	0.005 mg/L
Chromium (Cr)	0.1 mg/L
Cyanide (Cn)	0.2 mg/L
Fluoride (F)	2.0 mg/L (See section 6.1.3)
Mercury (Hg)	0.002 mg/L
Nickel (Ni)	0.1 mg/L
Nitrate-Nitrogen (NO_3-N)	10 mg/L See (section 6.1.11.3)
Nitrite-Nitrogen (NO_2-N)	1 mg/L
Total Nitrate-Nitrogen and Nitrite-Nitrogen (NO_3-N + NO_2-N)	10 mg/L
Selenium (Se)	0.05 mg/L
Thallium (Tl)	0.002 mg/L
Turbidity	See section 7.1

*MFL - million fibers per liter, with fiber length > 10 microns

6.1.1.2 Table of SMCLs

SMCLs Substance	**MCL**
Aluminum	0.05–0.2 mg/L
Chloride (Cl)	250 mg/L
Color	15 color units
Corrosivity	Noncorrosive (See section 7.)
Foaming agents	0.50 mg/L
Iron (Fe)	0.30 mg/L
Manganese (Mn)	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.1 mg/L
Sulfate (SO_4)	250 mg/L
Total Dissolved Solids (TDS)	500 mg/L
Zinc (Zn)	5 mg/L

The Maximum Contaminant Level Goals (MCLG) for lead and copper are as follows:

6.1.1.3 Table for Lead/Copper MCLGs

Lead	0 mg/L
Copper	1.3 mg/L

6.1.1.4 Arsenic. The analysis and determination of compliance with the **0.010** mg/L maximum contaminant level for arsenic use the requirements of 6.1.2

6.1.2 Sampling and Analytical Requirements:

6.1.2.1 Community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in subsection 6.1.1 in accordance with this section. Non-transient, non-community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in subsection 6.1.1 in accordance with this section. Transient, non-community water systems shall conduct monitoring to determine compliance with the nitrate and nitrite maximum contaminant levels in subsection 6.1.1 in accordance with this section.

6.1.2.2 Detection limits for each analytical method shall be in accordance with 40 CFR 141.23(a)(4)(i) as amended. Copies may be obtained from the Office of Drinking Water.

6.1.3 Monitoring shall be conducted as follows:

6.1.3.1 Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment [hereafter called a sampling point] beginning in the compliance period starting January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

6.1.3.1.1 Groundwater systems with 150 or more service connections shall begin monitoring for Phase II and Phase V contaminants on January 1, 1993.

6.1.3.1.2 Groundwater systems with less than 150 service connections shall begin monitoring for Phase II contaminants on January 1, 1993 and for Phase V contaminants on January 1, 1996.

6.1.3.2 Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment [hereafter called a sampling point] beginning in the compliance period beginning January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

NOTE: FOR PURPOSES OF THIS PARAGRAPH, SURFACE WATER SYSTEMS INCLUDE SYSTEMS WITH A COMBINATION OF SURFACE AND GROUND SOURCES.

6.1.3.2.1 Surface water systems with 150 or more service connections shall begin monitoring for Phase II and Phase V contaminants on January 1, 1993.

6.1.3.2.2 Surface water systems with less than 150 service connections shall begin monitoring for Phase II contaminants on January 1, 1993 and for Phase V contaminants on January 1, 1996.

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

6.1.3.4 The Division may reduce the total number of samples which must be analyzed by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory.

6.1.3.4.1 If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic chemical, then a follow-up sample must be taken within 14 days at each sampling point included in the composite. These samples must be analyzed for the contaminants which exceeded one-fifth of the MCL in the composite sample.

6.1.3.4.2 If the population served by the system is >3,300 persons, then compositing may only be permitted by the Division at sampling points within a single system. In systems serving <3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.

6.1.3.4.3 If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. he duplicates must be analyzed and the results reported to the Division within 14 days of collection.

6.1.3.5 The frequency of monitoring for asbestos shall be in accordance with subsection 6.1.4; the frequency of monitoring for antimony, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, 6.1.4 shall be in accordance with subsection 6.1.5; the frequency of monitoring for nitrate shall be in accordance with subsection 6.1.6; and the frequency of monitoring for nitrite shall be in accordance with subsection 6.1.7.

6.1.4 The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in subsection 6.1.4 shall be conducted as follows:

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

6.1.4.2 If the system believes it is not vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos-cement pipe, or both, it may apply to the Division for a waiver of the monitoring requirement in subsection 6.1.4.1. If the Division grants the waiver, the system is not required to monitor.

6.1.4.3 The Division may grant a waiver based on a consideration of the following factors:

6.1.4.3.1 Potential asbestos contamination of the water source, and

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

6.1.4.4 A waiver remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver must monitor in accordance with the provisions of subsection 6.1.3.

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

6.1.4.6 A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of subsection 6.1.3.

6.1.4.7 A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe shall take one sample at each entry point after treatment and a minimum of one tap sample served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

6.1.4.8 A system which exceeds PMCL listed in subsection 6.1.1 shall monitor quarterly beginning in the next quarter after the violation occurred.

6.1.4.9 The Division may decrease the quarterly monitoring requirement to the frequency specified in subsection 6.1.4.1 provided the Division has determined that the system is reliably and consistently below the maximum contaminant level. In no case can a Division make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface (or combined surface/ground) water system takes a minimum of four quarterly samples.

6.1.4.10 If monitoring data collected after January 1, 1990 are generally consistent with the requirements of this section then the Division may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

6.1.5 The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in subsection 6.1.1 for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be as follows:

6.1.5.1 Groundwater systems shall take one sample at each sampling point once every three (3) years. Surface Water systems [or combined surface/ground] shall take one sample annually at each sampling point beginning January 1, 1993.

6.1.5.2 The system may apply to the Division for a waiver from the monitoring frequencies specified in subsection 6.1.5.1.

6.1.5.3 A condition of the waiver shall require that a system shall take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one compliance cycle (i.e., nine years).

6.1.5.4 The Division may grant a waiver provided surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (At least one sample shall have been taken since January 1, 1990) Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.

6.1.5.5 In determining the appropriate reduced monitoring frequency, the Division shall consider:

6.1.5.5.1 Reported concentrations from all previous monitoring.

6.1.5.5.2 The degree of variation in reported concentrations; and

6.1.5.5.3 Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the systems configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.

6.1.5.6 A decision by the Division to grant a waiver shall be made in writing and shall set forth the basis for the determination. The determination may be initiated by the Division or upon an application by the public water system. The public water system shall specify the basis for its request. The Division shall review and, where appropriate, revise its determination of the appropriate monitoring frequency when the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency become available.

6.1.5.7 Systems which exceed the MCLs as calculated in subsection 6.1.11 shall monitor quarterly beginning in the next quarter after the violation occurred.

6.1.5.8 The Division may decrease the quarterly monitoring requirement to the frequencies specified in subsections 6.1.5.1 and 6.1.5.2 provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Division make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

6.1.5.9 All new systems that use a new source of water or existing systems that add 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 Division. The system must also comply with the initial sampling frequencies specified by the Division to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

6.1.6 All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate in subsection 6.1.1.

6.1.6.1 Community and non-transient, non-community water systems served by groundwater systems shall monitor annually beginning January 1, 1993; systems served by surface water shall monitor quarterly beginning January 1, 1993.

6.1.6.2 For community and non-transient, non-community water systems, the repeat monitoring frequency for groundwater systems shall be quarterly for at least one year following any one sample in which the concentration is >50 percent of the MCL. The Division may allow a groundwater system to reduce the sampling frequency to annually after four consecutive quarterly samples are reliably and consistently less than the MCL.

6.1.6.3 For community and non-transient, non-community water systems, the Division may allow a surface water system to reduce the sampling frequency to annually if all analytical results from four consecutive quarters are <50 percent of the MCL. A surface water system shall return to quarterly monitoring if any one sample is >50 percent of the MCL.

6.1.6.4 Each transient non-community water system shall monitor annually beginning January 1, 1993.

6.1.6.5 After the initial round of quarterly sampling is completed, each community and non-transient non-community system which is monitoring annually shall take subsequent samples during the quarter(s) which previously resulted in the highest analytical result.

6.1.7 All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrite in subsection 6.1.1

6.1.7.1 All public water systems shall take one sample at each sampling point in the distribution system during the compliance period beginning January 1, 1993 and ending December 31, 1995.

6.1.7.2 After the initial sample, systems where an analytical result for nitrite is <50 percent of the MCL shall monitor at the frequency specified by the Division.

6.1.7.3 For community, non-transient, non-community, and transient non-community water systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is >50 percent of the MCL. The Division may allow a system to reduce the sampling frequency to annually after determining the system is reliably and consistently less than the MCL.

6.1.7.4 Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.

6.1.8 Confirmation Samples:

6.1.8.1 Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, or thallium indicate an exceedance of the maximum contaminant level, the Division may require that one additional sample be collected, as soon as possible after the initial sample was taken (but not to exceed two weeks), at the same sampling point.

6.1.8.2 Where nitrate or nitrite sampling results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample. Systems unable to comply with the 24-hour sampling requirement must immediately notify the consumers in the area served by the public water system in accordance with subsection 4.2. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

6.1.8.3 If a Division-required confirmation sample is taken for any contaminant, then the results of the initial and confirmation sample shall be averaged. The resulting average shall be used to determine the system's compliance in accordance with subsection 6.1.11. The Division has the discretion to delete results of obvious sampling errors. Sampling errors include, but are not limited to samples collected from the wrong system or samples collected from private wells located within a public water system.

6.1.9 The Division may require more frequent monitoring than specified in subsections 6.1.4, 6.1.5, 6.1.6 and 6.1.7 or may require confirmation samples for positive and negative results at its discretion.

6.1.10 Systems may apply to the Division to conduct more frequent monitoring than the minimum monitoring frequencies specified in this section.

6.1.11 Compliance with subsection 6.1.1 shall be determined based on the analytical result(s) obtained at each sampling point:

6.1.11.1 For systems which are conducting monitoring at a frequency greater than annual, compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, 6.1.4 is determined by a running annual average at each sampling point. If the average at any sampling point is greater than the MCL, then the system is out of compliance. If anyone sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample below the detection limit shall be calculated at zero for the purpose of determining the annual average. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.

6.1.11.2 For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, 6.1.4 if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Division, the determination of compliance will be based on the annual average of the initial MCL exceedance and any Division-required confirmation samples. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.

6.1.11.3 Compliance with the maximum contaminant levels for nitrate and nitrite is determined based on one sample if the levels of these contaminants are below the MCLs. If the levels of nitrate and/or nitrite exceed the MCLs in the initial sample, a confirmation sample is required and compliance shall be determined based on the average of the initial and confirmation samples.

6.1.11.4 If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Division may allow the system to give public notice to only the area served by that portion of the system which is out of compliance.

6.1.11.5 Arsenic sampling results will be reported to the nearest 0.001 mg/L.

6.1.12 Each public water system shall monitor at the time designated by the Division during each compliance period.

6.1.13 At the discretion of the Division, nitrate levels not to exceed 20 mg/L may be allowed in TNCWS and NTNCWS if the supplier of water demonstrates to the satisfaction of the Division that:

6.1.13.1 Such water will not be available to children under one (1) year of age;

6.1.13.2 There will be continuous posting of the fact that nitrate levels exceed ten (10) mg/L and the potential health effects of exposure and;

6.1.13.3 No adverse health effects shall result.

6.1.3 Fluoride (F):

6.1.3.1 Where fluoridation has been or will be instituted as provided by Delaware Law and the fluoride content of a water supply is less than 0.8 mg/L, fluoride should be adjusted to provide a concentration within a range of 0.8-1.2 mg/L and shall not exceed 2.0 mg/L. Defluoridation of water shall be provided when the natural fluoride concentration exceeds 2.0 mg/L. In addition to the sampling and analysis required by section 6.1.5, fluoridated and defluoridated water supplies shall be sampled and analyzed daily by the supplier of water at a representative point(s) in the water supply system. In the event that the fluoride level exceeds 2.0 mg/L, samples shall be taken every two hours until the level returns to 2.0 mg/L [or less]. The exceedance shall be treated as a Tier 2 violation requiring public notification. If the fluoride level exceeds 4.0 mg/L a Tier 1 public notice is required. The fluoride levels shall be reported to the Division pursuant to subsection 4.1.1.

6.1.3.2 All municipal water supplies, whether municipally owned or privately owned, shall comply with subsection 6.1.3.1. All affected water supplies shall submit cost estimates to the Department of Health and Social Services no later than November 15, 1998.

6.1.4 Sodium (Na):

6.1.4.1 The supplier of water for a CWS shall collect and analyze one (1) sample per plant at the entry point of the distribution system for the determination of sodium concentration levels; samples must be collected and analyzed annually for systems utilizing surface water sources in whole or in part and at least every three (3) years for systems utilizing solely ground water sources. The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with Division approval be considered one (1) treatment plant for determining the minimum number of samples. The supplier of water may be required by the Division to collect and analyze water samples for sodium more frequently in locations where the sodium content is variable.

6.1.4.2 The supplier of water shall report to the Division the results of analyses for sodium pursuant to section 4.1.1.

6.1.4.3 The supplier of water shall notify appropriate local and State public health officials of the sodium levels by written notice by direct mail within three (3) months. A copy of each notice required to be provided by this paragraph shall be sent to the Division within ten (10) days of issuance. The supplier of water is not required to notify appropriate local and State public health officials of the sodium levels where the Division provides such notices in lieu of the supplier.

6.1.4.4 Analysis for sodium shall performed in accordance with 40 CFR 141.23(k)(1) as amended. Copies may be obtained from the Office of Drinking Water.

6.1.5 Inorganic Compliance Determination:

6.1.5.1 Analysis for the purpose of determining compliance with subsection 6.1.1 shall be in accordance with the following:

6.1.5.1.1 PMCL analyses for all CWSs utilizing surface water sources shall be conducted annually. SMCL analyses shall be performed at the discretion of the Division.

6.1.5.1.2 PMCL analyses for all CWSs utilizing only ground water sources shall be conducted at three (3) year intervals. SMCL analyses shall be performed at the discretion of the Division.

6.1.5.1.3 For NCWSs and NTNCWSs, whether supplied by surface or ground water sources, analyses for nitrate shall be conducted at intervals determined by the Division.

6.1.5.1.4 The Division has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by its sanctioned representatives and agencies.

6.1.5.2 The provision of subsections 6.1.5.6 and 6.1.5.7 notwithstanding compliance with the PMCL for nitrate shall be determined on the basis of the mean of two (2) analyses. When a level exceeding the PMCL for nitrate is found, a second analysis shall be initiated within twenty-four (24) hours, and if the mean of the two (2) analyses exceeds the PMCL, the supplier of water shall report his findings to the Division pursuant to subsection 4.1 and shall notify the public pursuant to subsection 4.2.

6.1.5.3 For the initial analyses required by subsections 6.1.5.1, 6.1.5.2 and 6.1.5.3, data for surface waters acquired within one (1) year prior to the effective date and data for ground waters acquired within three (3) years prior to the effective date of this section may be substituted at the discretion of the Division.

6.1.6 Analytical Methodology:

6.1.6.1 Analyses conducted to determine compliance with subsection 6.1.1 for inorganic chemicals shall be made in accordance with the following methods.

6.1.6.1.1 PMCLs shall be in accordance with 40 CFR 141.23(k)(1) as amended. Copies may be obtained from the Office of Drinking Water.

6.1.6.1.2 SMCLs shall be accordance with 40 CFR section 143.4 as amended. Copies may be obtained from the Office of Drinking Water.

6.1.6.1.3 Sample Collection and Preservation: - Sample collection for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium and thallium under this section shall be conducted using the sample preservation method(s), container, and maximum holding time procedures in accordance with 40 CFR 141.23(k)(2) as amended. Copies may be obtained from the Office of Drinking Water.

6.1.6.1.4 Lab Approval: Analysis under this section shall only be conducted by laboratories that have received approval by EPA, other approved certifying organization, or the State of Delaware. To receive approval to conduct analyses for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, 6.1.4 the laboratory must:

6.1.6.1.4.1 Analyze Performance Evaluation samples annually in accordance with subsection 1.14.

6.1.6.1.4.2 Achieve quantitative results on the analyses that are in accordance with 40 CFR 141.23(k)(3)(ii) and 40 CFR 141.23(k)(3)(iii) as amended. Copies may be obtained from the Office of Drinking Water.

6.1.7 Lead (Pb) and Copper (Cu):

6.1.7.1 Unless otherwise indicated, each of the provisions of this section applies to CWSs and NTNCWSs. The requirements in subsection 6.1.7 shall take effect November 9, 1992.

6.1.7.1.1 General Requirements:

6.1.7.1.1 Applicability and effective dates.

6.1.7.1.1.1 The requirements of subsection 6.1.7 constitute national primary drinking water regulations for lead and copper. Unless otherwise indicated, each of the provisions of this section applies to community water systems and non-transient, non-community water systems (hereinafter referred to as “water systems” or “systems”).

6.1.7.1.1.2 [Reserved]

6.1.7.1.2 Scope. These regulations establish a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumer’s taps.

6.1.7.1.3 Action Level:

6.1.7.1.3.1 The lead action level is exceeded if the concentration of lead in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with section 6.1.7.7 is greater than 0.015 mg/L (i.e., if the “90th percentile” lead level is greater than 0.015 mg/L).

6.1.7.1.3.2 The copper action level is exceeded if the concentration of copper in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with section 6.1.7.7 is greater than 1.3 mg/L (i.e., if the “90th percentile” copper level is greater than 1.3 mg/L).

6.1.7.1.3.3 The 90th percentile lead and copper levels shall be computed as follows:

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

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

6.1.7.1.3.3.3 The contaminant concentration in the numbered sample yielded by the calculation in subsection 6.1.7.1.3.2 is the 90th percentile contaminant level.

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

6.1.7.1.3.3.5 For a public water system that has been allowed by the Division to collect fewer than five samples in accordance with subsection 6.1.7.7.3 the sample result with the highest concentration is considered the 90th percentile value.

6.1.7.1.4 Corrosion Control Treatment Requirements:

6.1.7.1.4.1 All water systems shall install and operate optimal corrosion control treatment as defined in subsection 1.1.

6.1.7.1.4.2 Any water system that complies with the applicable corrosion control treatment requirements specified by the Division under subsections 6.1.7.1.4 and 6.1.7.1.5 shall be deemed in compliance with each treatment requirement contained in subsection 6.1.7.1.4.1.

6.1.7.1.5 Source Water Treatment Requirements: Any system exceeding the lead or copper action level shall implement all applicable source water treatment requirements specified by the Division under section 6.1.7.4.

6.1.7.1.6 Lead Service Line Replacement: Any system exceeding the lead action level after implementation of applicable corrosion control and source water treatment requirements shall complete the lead service line replacement requirements contained in section 6.1.7.5.

6.1.7.1.7 Public Education Requirements: Pursuant to section 6.1.7.6, all water systems must provide a consumer notice of lead tap water monitoring results to persons served at the sites (taps) that are tested. Any system exceeding the lead action level shall implement the public education requirements contained in section 6.1.7.6.

6.1.7.1.8 Monitoring and Analytical Requirements: Tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results under this section shall be completed in compliance with subsections 6.1.7.7, 6.1.7.8, 6.1.7.9 and 6.1.7.12.

6.1.7.1.9 Reporting Requirements: Systems shall report to the Division any information required by the treatment provisions of this section and subsection 6.1.7.10.

6.1.7.1.10 Recordkeeping Requirements: Systems shall maintain records in accordance with subsection 6.1.7.11.

6.1.7.1.11 Violation of National Primary Drinking Water Regulations:

6.1.7.1.11.1 Failure to comply with the applicable requirements of subsection 6.1.7 including requirements established by the Division pursuant to these provisions, shall constitute a violation of the national primary drinking water regulations for lead and/or copper.

6.1.7.2 Applicability of Corrosion Control Treatment Steps for Small, Medium-Size and Large Water Systems:

6.1.7.2.1 Systems shall complete the applicable corrosion control treatment requirements described in subsection 6.1.7.3 by the deadlines established in this section.

6.1.7.2.1.1 A large system (serving >50,000 persons) shall complete the corrosion control treatment steps specified in subsection 6.1.7.2.4, unless it is deemed to have optimized corrosion control under subsection 6.1.7.2.2.2 or 6.1.7.2.2.3.

6.1.7.2.1.2 A small system (serving <3,300 persons) and a medium-size system (serving >3,300 and <50,000 persons) shall complete the corrosion control treatment steps specified in paragraph 6.1.7.2.5, unless it is deemed to have optimized corrosion control under subsections 6.1.7.2.2.1, 6.1.7.2.2.2 or 6.1.7.2.2.3.

6.1.7.2.2 A system is deemed to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in this section if the system satisfies one of the following criteria specified in 6.1.7.2.2.1 through 6.1.7.2.2.3. Any such system deemed to have optimized corrosion control under this paragraph, and which has treatment in place, shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the Division determines appropriate to ensure that optimal corrosion control treatment is maintained.

6.1.7.2.2.1 A small or medium-size water system is deemed to have optimized corrosion control if the system meets the lead and copper action levels during each of two consecutive six-month monitoring periods conducted in accordance with subsection 6.1.7.7.

6.1.7.2.2.2 Any water system may be deemed by the Division to have optimized corrosion control treatment if the system demonstrates to the satisfaction of the Division that it has conducted activities equivalent to the corrosion control steps applicable to such system under this section. If the Division makes this determination, it shall provide the systems with written notice explaining the basis for its decision and shall specify the water quality control parameters representing optimal corrosion control in accordance with subsection 6.1.7.3.6. Water systems deemed to have optimized corrosion control under this paragraph shall operate in compliance with the Division-designated optimal water quality control parameters in accordance with subsection 6.1.7.3.7 and continue to conduct lead and copper tap and water quality parameter sampling in accordance with subsection 6.1.7.7.4.3 and subsection 6.1.7.8.4 respectively. A system shall provide the Division with the following information in order to support a determination under this paragraph.

6.1.7.2.2.2.1 The results of all test samples collected for each of the water quality parameters in section 6.1.7.3.3.3.

6.1.7.2.2.2.2 A report explaining the test methods used by the water system to evaluate the corrosion control treatments listed in subsection 6.1.7.3.3.1, the results of all tests conducted, and the basis for the system's selection of optimal corrosion control treatment.

6.1.7.2.2.2.3 A report explaining how corrosion control has been installed and how it is being maintained to insure minimal lead and copper concentrations at consumer's taps; and

6.1.7.2.2.2.4 The results of tap water samples collected in accordance with subsection 6.1.7.7 at least once every six months for one year after corrosion control has been installed.

6.1.7.2.2.3 Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with subsection 6.1.7.7 and source water monitoring conducted in accordance with subsection 6.1.7.9 that demonstrates for two consecutive six-month monitoring periods that the difference between the 90th percentile tap water lead level computed under subsection 6.1.7.1.1.3, and the highest source water lead concentration, is less than the Practical Quantitation Level (PQL) for lead specified in subsection 6.1.7.12.

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

6.1.7.2.2.3.2 Any water system deemed to have optimized corrosion control in accordance with this paragraph shall continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in subsection 6.1.7.7.3 and collect the samples at times and locations specified in subsection 6.1.7.7.4.4. Any such system that has not conducted a round of monitoring pursuant to subsection 6.1.7.7.4 since September 30, 1997, shall complete a round of monitoring pursuant to this paragraph no later than September 30, 2000.

6.1.7.2.2.3.3 Any water system deemed to have optimized corrosion control pursuant to this paragraph shall notify the Division in writing pursuant to section 6.1.7.10.1.3 of any upcoming long-term change in treatment or addition of a new source as described in that section. The division must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Division may require any such system to conduct additional monitoring or to take other action the Division deems appropriate to ensure that such systems maintain minimal levels of corrosion in the distribution system.

6.1.7.2.2.3.4 As of July 12, 2001 a system is not deemed to have optimized corrosion control under this paragraph, shall implement corrosion control treatment pursuant to section 6.1.7.2.2.3.5 unless it meets the copper action level.

6.1.7.2.2.3.5 Any system triggered into corrosion control because it is no longer deemed to have optimized corrosion control under this paragraph shall implement corrosion control treatment in accordance with the deadlines in subsection 6.1.7.2.5. Any such large system shall adhere to the schedule specified in that subsection for medium-sized systems, with the time periods for completing each step being triggered by the date the system is no longer deemed to have optimized corrosion control under this subsection.

6.1.7.2.3 Any small or medium-size water system that is required to complete the corrosion control steps due to its exceedance of the lead or copper action level may cease completing the

~~treatment steps whenever the system meets both action levels during each of two consecutive monitoring periods conducted pursuant to subsection 6.1.7.7 and submits the results to the Division. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system (or the Division, as the case may be) shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The Division may require a system to repeat treatment steps previously completed by the system where the Division determines that this is necessary to properly implement the treatment requirements of this section. The Division shall notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small or medium-size system to implement corrosion control treatment steps in accordance with subsection 6.1.7.2.5 (including systems deemed to have optimized corrosion control under subsection 6.1.7.2.2.1) is triggered whenever any small or medium-size system exceeds the lead or copper action level.~~

~~6.1.7.2.4 Treatment Steps and Deadlines for Large Systems:~~

~~6.1.7.2.4.1 Except as provided in subsections 6.1.7.2.2.2 and 6.1.7.2.2.3, large systems shall complete the following corrosion control treatment steps (described in the referenced portions of subsections 6.1.7.3, 6.1.7.7 and 6.1.7.8 by the indicated dates.~~

~~Step 1: The system shall conduct two six month initial monitoring periods by January 1, 1993.~~

~~Step 2: The system shall complete corrosion control studies, section 6.1.7.3.3, in 18 months, by July 1, 1994.~~

~~Step 3: The Division shall designate optimal corrosion control treatment, section 6.1.7.3.4, in 6 months, by January 1, 1995.~~

~~Step 4: The system shall install optimal corrosion control treatment, section 6.1.7.3.5, in 24 months, by January 1, 1997.~~

~~Step 5: The system shall complete follow-up sampling, section 6.1.7.7.4.2 and section 6.1.7.8.3, in 12 months, by January 1, 1998~~

~~Step 6: The Division shall review installation of treatment and designate optimal water quality control parameters, section 6.1.7.3.6, in 6 months, by July 1, 1998.~~

~~Step 7: The system shall operate in compliance with the Division-specified optimal water quality control parameters, section 6.1.7.3.7, and continue to conduct tap sampling, section 6.1.7.7.4 and section 6.1.7.8.4.~~

~~6.1.7.2.5 Treatment Steps and Deadlines for Small-and Medium-Size Systems:~~

~~6.1.7.2.5.1 Except as provided in subsection 6.1.7.2.2, small and medium-size systems shall complete the following corrosion control treatment steps (described in the referenced portions of subsections 6.1.7.3, 6.1.7.7 and 6.1.7.8 by the indicated time periods.~~

~~Step 1: The system shall conduct initial tap sampling, subsection 6.1.7.7.4.1 and subsection 6.1.7.8.2, until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under subsection 6.1.7.7.4.4. A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment, section 6.1.7.3.1, within six months after the end of the monitoring period during which it exceeds one of the action levels.~~

~~Step 2: Within 12 months after the end of the monitoring period during which a system exceeds the lead or copper action level, the Division may require the system to perform corrosion control studies (subsection 6.1.7.3.2). If the Division does not require the system to perform such studies, the Division shall specify optimal corrosion control treatment, (subsection 6.1.7.3.4) within the following time frames.~~

~~6.1.7.2.5.1.1 For medium-size systems, within 18 months after the end of the monitoring period during which such system exceeds the lead or copper action level.~~

~~6.1.7.2.5.1.2 For small systems, within 24 months after the end of the monitoring period during which such system exceeds the lead or copper action level.~~

~~Step 3: If the Division requires a system to perform corrosion control studies under step 2, the system shall complete the studies, subsection 6.1.7.3.3, within 18 months after the Division requires that such studies be conducted.~~

~~Step 4: If the system has performed corrosion control studies under step 2, the Division shall designate optimal corrosion control treatment, subsection 6.1.7.3.4, within 6 months after completion of step 3.~~

Step 5: The system shall install optimal corrosion control treatment, subsection 6.1.7.3.5, within 24 months after the Division designates optimal corrosion control treatment.

Step 6: The system shall complete follow-up sampling, subsection 6.1.7.7.4.2 and subsection 6.1.7.8.3, within 36 months after the Division designates optimal corrosion control treatment.

Step 7: The Division shall review the system's installation of treatment and designate optimal water quality control parameters, subsection 6.1.7.3.6, within 6 months after completion of Step 6.

Step 8: The system shall operate in compliance with the Division-designated optimal water quality control parameters, subsection 6.1.7.3.7, and continue to conduct tap sampling, subsection 6.1.7.7.4.3 and subsection 6.1.7.8.4.

6.1.7.3 Description of Corrosion Control Treatment Requirements: Each System shall complete the corrosion control treatment requirements described below which are applicable to such systems under subsection 6.1.7.2.

6.1.7.3.1 System Recommendation Regarding Corrosion Control Treatment: Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, small and medium-size water systems exceeding the lead or copper action level shall recommend installation of one or more of the corrosion control treatments listed in subsection 6.1.7.3.3.1 which the system believes constitutes optimal corrosion control for that system. The Division may require the system to conduct additional water quality parameter monitoring in accordance with subsection 6.1.7.8.2 to assist the Division in reviewing the system's recommendation.

6.1.7.3.2 Division Decision to Require Studies of Corrosion Control Treatment (Applicable to Small and Medium-Size Systems): The Division may require any small or medium-size system that exceeds the lead or copper action level to perform corrosion control studies under subsection 6.1.7.3.3 to identify optimal corrosion control treatment for the system.

6.1.7.3.3 Performance of Corrosion Control Studies:

6.1.7.3.3.1 Any public water system performing corrosion control studies shall evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for that system:

6.1.7.3.3.1.1 Alkalinity and pH adjustment;

6.1.7.3.3.1.2 Calcium hardness adjustment; and

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

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

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

Lead;

Copper;

pH;

Alkalinity;

Calcium;

Conductivity;

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

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

Water temperature.

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

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

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

6.1.7.3.3.4 The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatments processes.

6.1.7.3.3.5 On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the Division in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in subsections 6.1.7.3.3.1 through 6.1.7.3.3.5.

6.1.7.3.4 Division Designation of Optimal Corrosion Control Treatment:

6.1.7.3.4.1 Based upon consideration of available information including, where applicable, studies performed under subsection 6.1.7.3.3 and a system's recommended treatment alternative, the Division shall either approve the corrosion control treatment option recommended by the system, or designate alternative corrosion control treatment(s) from among those listed in subsection 6.1.7.3.3.1. When designating optimal treatment the Division shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other quality treatment processes.

6.1.7.3.4.2 The Division shall notify the system of its decision on optimal corrosion control treatment in writing and explain the basis for this determination within 6 months of receiving follow up samples. If the Division requests additional information to aid its review, the water system shall provide the information.

6.1.7.3.5 Installation of Optimal Corrosion Control: Each system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated by the Division under subsection 6.1.7.3.4.

6.1.7.3.6 Division Review of Treatment and Specification of Optimal Water Quality Control Parameters: The Division shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the water system and determine whether the system has properly installed and operated the optimal corrosion control treatment designated by the Division in subsection 6.1.7.3.4. Upon reviewing the results of tap water and water quality parameter monitoring by the system, both before and after the system installs optimal corrosion control treatment, the Division shall designate:

6.1.7.3.6.1 A minimum value or a range of values for pH measured at each entry point to the distribution system;

6.1.7.3.6.2 A minimum pH value measured in all tap samples. Such value shall be equal to or greater than 7.0 unless the Division determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;

6.1.7.3.6.3 If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the Division determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system;

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

6.1.7.3.6.5 If calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples. The values for the applicable water quality control parameters listed above shall be those that the Division determines to reflect optimal corrosion control treatment for the system. The Division may designate values for additional water quality control parameters determined by the Division to reflect optimal corrosion control for the system. The Division shall notify the system in writing of these determinations and explain the basis for its decisions.

6.1.7.3.7 Continued Operation and Monitoring: All systems shall continue to operate and maintain optimal corrosion control treatment, including maintaining water quality parameter values at or above minimum values or within ranges designated by the Division under subsection 6.1.7.3.6 in accordance with this paragraph for all samples collected under subsection 6.1.7.8.4 through 6.1.7.8.6. Compliance with requirements of this paragraph shall be determined every six months, as specified under subsection 6.1.7.8.4. A water system is out of compliance with the requirements of this paragraph for a six-month period if it has excursions for any Division-

specified parameter on more than nine days during the period. An excursion occurs whenever the daily value for one or more of the water quality parameters measured at a sampling location is below the minimum value or outside the range designated by the Division. Daily values are calculated as follows. The Division has the discretion to delete results of obvious sampling errors from this calculation.

6.1.7.3.7.1 On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the average of all the results collected during the day regardless of whether they are collected through continuous monitoring, grab sampling, or a combination of both. If EPA has approved an alternative formula under 40 CFR section 142.16 of this chapter in the State's application for a program revision submitted pursuant to 40 CFR section 142.12 of this chapter, the State's formula shall be used to aggregate multiple measurements taken at a sampling point for the water quality parameter in lieu of the formula in this paragraph.

6.1.7.3.7.2 On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value shall be that measurement.

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

6.1.7.3.8 Modification of Division's Corrosion Control Treatment Decision: Upon its own initiative, or in response to a request by the water system or other interested party, the Division may modify treatment determination. The requests in writing must explain why the change is appropriate and provide supporting documentation. The treatment may be changed when the Division determines that it is necessary for the water system to continue optimizing corrosion control. The Division's decision must specify new treatment, explain the basis for its decision, and provide for implementation.

6.1.7.3.9 EPA Treatment Decisions in Lieu of the Division's Decisions: The regional administrator may issue federal determinations in lieu of the Division's determinations when:

6.1.7.3.9.1 The Division fails to issue a determination in a timely manner.

6.1.7.3.9.2 The Division abuses its discretion in a substantial number of cases or in cases affecting large populations.

6.1.7.3.9.3 The technical basis of the Division's decision is indefensible in federal enforcement action(s).

6.1.7.4 Source Water Treatment Requirements: Systems shall complete the applicable source water monitoring and treatment requirements (described in the referenced portions of subsection 6.1.7.4.2, and in subsections 6.1.7.7 and 6.1.7.9 by the following deadlines:

6.1.7.4.1 Deadlines for Completing Source Water Treatment Steps:

Step 1: A system exceeding the lead or copper action level shall complete lead and copper source water monitoring (subsection 6.1.7.9.2) and make a treatment recommendation to the Division (subsection 6.1.7.4.2.1) no later than 180 days after the end of the monitoring period during which the lead or copper action level was exceeded.

Step 2: The Division shall make a determination regarding source water treatment, subsection 6.1.7.4.2.2 within 6 months after submission of monitoring results under step 1.

Step 3: If the Division requires installation of source water treatment, the system shall install the treatment, subsection 6.1.7.4.2.3, within 24 months after completion of step 2.

Step 4: The system shall complete follow-up tap water monitoring, subsection 6.1.7.7.4.2, and source water monitoring, subsection 6.1.7.9.3, within 36 months after completion of step 2.

Step 5: The Division shall review the system's installation and operation of source water treatment and specify maximum permissible source water levels for lead and copper, subsection 6.1.7.4.2.4, within 6 months after completion of step 4.

Step 6: The system shall operate in compliance with the Division-specified maximum permissible lead and copper source water levels, subsection 6.1.7.4.2.4, and continue source water monitoring, subsection 6.1.7.9.4.

6.1.7.4.2 Description of Source Water Treatment Requirements:

6.1.7.4.2.1 System Treatment Recommendation: Any system which exceeds the lead or copper action level shall recommend in writing to the Division the installation and operation of one of the source water treatments listed in subsection 6.1.7.4.2.2. A system may recommend that

no treatment be installed based upon a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.

6.1.7.4.2.2 Division Determination Regarding Source Water Treatment: The Division shall complete an evaluation of the results of all source water samples submitted by the water system to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps. If the Division determines that treatment is needed, the Division shall either require installation and operation of the source water treatment recommended by the system (if any) or require the installation and operation of another source water treatment from among the following: ion exchange, reverse osmosis, lime softening or coagulation/ filtration. If the Division requests additional information to aid in its review, the water system shall provide the information by the date specified by the Division in its request. The Division shall notify the system in writing of its determination and set forth the basis for its decision.

6.1.7.4.2.3 Installation of Source Water Treatment: Each system shall properly install and operate the source water treatment designated by the Division under subsection 6.1.7.4.2.2.

6.1.7.4.2.4 Division Review of Source Water Treatment and Specification of Maximum Permissible Source Water Levels: The Division shall review the source water samples taken by the water system both before and after the system installs source water treatment, and determine whether the system has properly installed and operated the source water treatment designated by the Division. Based upon its review, the Division shall designate the maximum permissible lead and copper concentrations for finished water entering the distribution system. Such levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The Division shall notify the system in writing and explain the basis for its decision.

6.1.7.4.2.5 Continued Operation and Maintenance: Each water system shall maintain lead and copper levels below the maximum permissible concentrations designated by the Division at each sampling point monitored in accordance with subsection 6.1.7.9. The system is out of compliance with this paragraph if the level of lead or copper at any sampling point is greater than the maximum permissible concentration designated by the Division.

6.1.7.4.2.6 Modification of Division Treatment Decisions: Upon its own initiative or in response to a request by a water system or other interested party, the Division may modify its determination of the source water treatment under subsection 6.1.7.4.2.2, or maximum permissible lead and copper concentrations for finished water entering the distribution system under subsection 6.1.7.4.2.4. A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The Division may modify its determination where it concludes that such change is necessary to ensure that the system continues to minimize lead and copper concentrations in source water. A revised determination shall be made in writing and set forth the new treatment requirements, explain the basis for the Division's decision and provide an implementation schedule for completing the treatment modifications.

6.1.7.4.2.7 EPA Treatment Decisions in Lieu of the Division's Decisions: The regional administrator may issue federal determinations in lieu of the Division's determination when:

6.1.7.4.2.7.1 The Division fails to issue a determination in a timely manner.

6.1.7.4.2.7.2 The Division abuses its discretion in a substantial number of cases or in cases affecting large populations.

6.1.7.4.2.7.3 The technical basis of the Division's decision is indefensible in federal enforcement action(s).

6.1.7.5 Lead Service Line Replacement Requirements:

6.1.7.5.1 Systems that fail to meet the lead action level in tap samples taken pursuant to subsection 6.1.7.7.4.2 after installing corrosion control and/or source water treatment (whichever sampling occurs later) shall replace lead service lines in accordance with the requirements of this section. If a system is in violation of subsections 6.1.7.2 or 6.1.7.4 for failure to install source water or corrosion control treatment, the Division may require the system to commence lead service line replacement under this section after the date by which the system was required to conduct monitoring under subsection 6.1.7.7.4.2 has passed.

6.1.7.5.1.1 A system shall replace annually at least 7 percent of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The systems shall identify the initial number of lead service lines in its distribution system, including an identification of the

~~portion(s) owned by the system, based upon a materials evaluation, including the evaluation required under subsection 6.1.7.7.1 and relevant legal authorities (e.g., contracts, local ordinances) regarding the portion owned by the system. The first year of lead service line replacement shall begin on the first day following the end of the monitoring period in which the action level was exceeded under subsection 6.1.7.5.1. If monitoring is required annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs. If the Division has established an alternate monitoring period, then the end of the monitoring period will be the last day of that period.~~

~~6.1.7.5.1.2 Any water system resuming a lead service line replacement program after the cessation of its lead service line replacement program as allowed by subsection 6.1.7.5.6 shall update its inventory of lead service lines to include those sites that were previously determined not to require replacement through the sampling provision under subsection 6.1.7.5.3. The system will then divide the updated number of remaining lead service lines by the number of remaining years in the program to determine the number of lines that must be replaced per year (7 percent lead service line replacement is based on a 15-year replacement program, so, for example, systems resuming lead service line replacement after previously conducting two years of replacement would divide the updated inventory by 13). For those systems that have completed a 15-year lead service line replacement program, the Division will determine a schedule for replacing or retesting lines that were previously tested under the replacement program when the system re-exceeds the action level.~~

~~6.1.7.5.3 A system is not required to replace an individual lead service line if the lead concentration in all service line samples from that line taken pursuant to subsection 6.1.7.7.2.3, is less than or equal to 0.015 mg/L.~~

~~6.1.7.5.4 A water system shall replace the entire service line (up to the building inlet) unless it demonstrates to the satisfaction of the Division under subsection 6.1.7.5.5 that it controls less than the entire service line. In such cases, the system shall replace the portion of the line which the Division determines is under the system's control. The system shall notify the user served by the line that the system will replace the portion of the service line under its control and shall offer to replace the building owner's portion of the line, but is not required to bear the cost of replacing the building owner's portion of the line. For buildings where only a portion of the lead service line is replaced, the water system shall inform the resident(s) that the system will collect a first flush tap water sample after partial replacement of the service line is completed if the resident(s) so desire. In cases where the resident(s) accept the offer, the system shall collect the sample and report the results to the resident(s) within 14 days following partial lead service replacement.~~

~~6.1.7.5.4.1 At least 45 days prior to commencing with the partial replacement of a lead service line, the water system shall provide notice to the resident(s) of all buildings served by the line explaining that they may experience a temporary increase in lead levels in their drinking water, along with guidance on measures consumers can take to minimize their exposure to lead. The Division may allow the water system to provide notice under the previous sentence less than 45 days prior to commencing partial lead service line replacement where such replacement is in conjunction with emergency repairs. In addition, the water system shall inform the resident(s) served by the line that the system will, at the system's expense, collect a sample from each partially-replaced lead service line that is representative of the water in the service line for analysis of lead content, as prescribed under subsection 6.1.7.7.2.3, within 72 hours after completion of the partial replacement of the service line. The system shall collect the sample and report the results of the analysis to the owner and the resident(s) served by the line within three business days of receiving the results. Mailed notices post-marked within three business days of receiving the results shall be considered "on time."~~

~~6.1.7.5.4.2 The water system shall provide the information required by subsection 6.1.7.5.4.1 to the residents of individual dwellings by mail or by other methods approved by the Division. In instances where multi-family dwellings are served by the line, the water system shall have the option to post the information at a conspicuous location.~~

~~6.1.7.5.5 A water system is presumed to control the entire lead service line (up to the building inlet) unless the system demonstrates to the satisfaction of the Division, in a letter submitted under subsection 6.1.7.10.5.4, that it does not have any of the following forms of control over the entire line (as defined by Division statutes, municipal ordinances, public service contracts or other applicable legal authority); authority to set standards for construction, repair, or~~

maintenance of the line, authority to replace, repair, or maintain the service line, or ownership of the service line. The Division shall review the information supplied by the system and determine whether the system controls less than the entire service line, in such cases, shall determine the extent of the system's control. The Division's determination shall be in writing and explain the basis for its decision.

6.1.7.5.6 The Division shall require a system to replace lead service lines on a shorter schedule than that required by this section, taking into account the number of lead service lines in the system, where such a shorter replacement schedule is feasible. The Division shall make this determination in writing and notify the system of its finding within 6 months after the system is triggered into lead service line replacement based on monitoring referenced in subsection 6.1.7.5.1.

6.1.7.5.7 Any system may cease replacing lead service lines whenever first draw samples collected pursuant to subsection 6.1.7.7.2.2 meet the lead action level during each of two consecutive monitoring periods and the system submits the results to the Division. If the first draw samples in any such water system thereafter exceeds the lead action level, the system shall recommence replacing lead service lines, pursuant to subsection 6.1.7.5.2.

6.1.7.5.8 To demonstrate compliance with subsections 6.1.7.5.1 through 6.1.7.5.4, a system shall report to the Division the information specified in subsection 6.1.7.10.5.

6.1.7.6 Public education and supplemental monitoring requirements. All water systems must deliver a consumer notice of lead tap water monitoring results to persons served by the water system at sites that are tested, as specified in subsection 6.1.7.6.4. A water system that exceeds the lead action level based on tap water samples collected in accordance with subsection 6.1.7.7 shall deliver the public education materials contained in subsection 6.1.7.6.1 in accordance with the requirements of subsection 6.1.7.6.2. Water systems that exceed the lead action level must sample the tap water of any customer who requests it in accordance with subsection 6.1.7.6.3.

6.1.7.6.1 Content of written public education materials.

6.1.7.6.1.1 Community water systems and non-transient non-community water systems. Water systems must include the following elements in printed materials (e.g., brochures and pamphlets) in the same order as listed below. In addition, language in subsections 6.1.7.6.1.1.1 through 6.1.7.6.1.1.2 and 6.1.7.6.1.1.6 must be included in the materials, exactly as written, except for the text in brackets in these sections for which the water system must include system-specific information. Any additional information presented by a water system must be consistent with the information below and be in plain language that can be understood by the general public. Water systems must submit all written public education materials to the Division prior to delivery. The Division may require the system to obtain approval of the content of written public materials prior to delivery.

6.1.7.6.1.1.1 IMPORTANT INFORMATION ABOUT LEAD IN YOUR DRINKING WATER [INSERT NAME OF WATER SYSTEM] found elevated levels of lead in drinking water in some homes/buildings. Lead can cause serious health problems, especially for pregnant women and young children. Please read the information closely to see what you can do to reduce lead in your drinking water.

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

6.1.7.6.1.1.3 Sources of lead.

6.1.7.6.1.1.3.1 Explain what lead is.

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

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

6.1.7.6.1.1.4 Discuss the steps the consumer can take to reduce their exposure to lead in drinking water.

6.1.7.6.1.1.4.1 Encourage running the water to flush out the lead.

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

6.1.7.6.1.1.4.3 Explain that boiling water does not reduce lead levels.

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

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

6.1.7.6.1.1.5 Explain why there are elevated levels of lead in the system's drinking water (if known) and what the water system is doing to reduce the lead levels in homes/buildings in this area.

6.1.7.6.1.1.6 For more information, call us at [INSERT YOUR PHONE NUMBER] [(IF APPLICABLE), or visit our website at [INSERT YOUR WEBSITE HERE)]. For more information on reducing lead exposure around your home/building and the health effects of lead, visit EPA's Web site at http://www.epa.gov/lead or contact your health care provider.

6.1.7.6.1.2 Community water systems. In addition to including the elements specified in subsection 6.1.7.6.1.1 community water systems must:

6.1.7.6.1.2.1 Tell consumers how to get their water tested.

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

6.1.7.6.2 Delivery of public education material.

6.1.7.6.2.1 For public water systems serving a large proportion of non-English speaking consumers, as determined by the Division, 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.

6.1.7.6.2.2 A community water system that exceeds the lead action level on the basis of tap water samples collected in accordance with subsection 6.1.7.7, and that is not already conducting public education tasks under this section, must conduct the public education tasks under this section within 60 days after the end of the monitoring period in which the exceedance occurred:

6.1.7.6.2.2.1 Deliver printed materials meeting the content requirements of subsection 6.1.7.6.1 to all bill paying customers.

6.1.7.6.2.2.2.1 Contact customers who are most at risk by delivering education materials that meet the content requirements of subsection 6.1.7.6.1 to local public health agencies even if they are not located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users. The water system must contact the local public health agencies directly by phone or in person. The local public health agencies may provide a specific list of additional community based organizations serving target populations, which may include organizations outside the service area of the water system. If such lists are provided, systems must deliver education materials that meet the content requirements of subsection 6.1.7.6.1 to all organizations on the provided lists.

6.1.7.6.2.2.2.2 Contact customers who are most at risk by delivering materials that meet the content requirements of subsection 6.1.7.6.1 to the following organizations listed in 6.1.7.6.2.2.2.2.1 through 6.1.7.6.2.2.2.2.6 that are located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users:

6.1.7.6.2.2.2.2.1 Public and private schools or school boards.

6.1.7.6.2.2.2.2.2 Women, Infants and Children (WIC) and Head Start Programs.

6.1.7.6.2.2.2.2.3 Public and private hospitals and medical clinics.

6.1.7.6.2.2.2.2.4 Pediatricians.

6.1.7.6.2.2.2.2.5 Family planning clinics.

6.1.7.6.2.2.2.2.6 Local welfare agencies.

6.1.7.6.2.2.2.3 Make a good faith effort to locate the following organizations within the service area and deliver materials that meet the content requirements of subsection 6.1.7.6.1 to them, along with an informational notice that encourages distribution to all potentially affected customers or users. The good faith effort to contact at-risk customers may include requesting a specific list of these organizations from the local public health agencies, even if the agencies are not located within the water system's service area:

6.1.7.6.2.2.2.3.1 Licensed childcare centers

6.1.7.6.2.2.2.3.2 Public and private preschools

6.1.7.6.2.2.2.3.3 Obstetricians-Gynecologists and Midwives.

6.1.7.6.2.2.3 No less often than quarterly, provide information on or in each water bill as long as the system exceeds the action level for lead. The message on the water bill must include the following statement exactly as written except for the test in brackets for which the water system must include system-specific information: [INSERT NAME OF WATER SYSTEM] found high levels of lead in drinking water in some homes. Lead can cause serious health problems. For more information please call [INSERT NAME OF WATER SYSTEM] [or visit (INSERT YOUR WEBSITE HERE)] The message or delivery mechanism can be modified in consultation with the Division; specifically, the Division may allow a separate mailing of public education materials to customers if the waster system cannot place the information on water bills.

6.1.7.6.2.2.4 Post material meeting the content requirements of section 6.1.7.6.1 on the water system's website if the system serves a population greater than 100,000.

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

6.1.7.6.2.2.6 In addition to subsections 6.1.7.6.2.2.1 through 6.1.7.6.2.2.5, systems must implement at least three activities from one of the categories listed below. The educational content and selection of these activities must be determined in consultation with the Division.

6.1.7.6.2.2.6.1 Public Service Announcements.

6.1.7.6.2.2.6.2 Paid advertisements.

6.1.7.6.2.2.6.3 Public Area Information Displays.

6.1.7.6.2.2.6.4 Emails to customers.

6.1.7.6.2.2.6.5 Public meetings.

6.1.7.6.2.2.6.6 Household deliveries.

6.1.7.6.2.2.6.7 Targeted individual customer contact.

6.1.7.6.2.2.6.8 Direct material distribution to all multi-family homes and institutions.

6.1.7.6.2.2.6.9 Other methods approved by the Division.

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

6.1.7.6.2.3 As long as a community water system exceeds the action level, it must repeat the activities pursuant to subsection 6.1.7.6.2.2 as described in subsections 6.1.7.6.2.3.1 through 6.1.7.6.2.3.4.

6.1.7.6.2.3.1 A community water system shall repeat the tasks contained in subsections 6.1.7.6.2.2.1, 6.1.7.6.2.2.2 and 6.1.7.6.2.2.6 every 12 months.

6.1.7.6.2.3.2 A community water system shall repeat the tasks contained in section 6.1.7.6.2.2.3 with every billing cycle.

6.1.7.6.2.3.3 A community water system serving a population greater than 100,000 shall post and retain material on a publicly accessible website pursuant to subsection 6.1.7.6.2.2.4.

6.1.7.6.2.3.4 The community water system shall repeat the task in subsection 6.1.7.6.2.2.5 twice every 12 months on a schedule agreed upon with the Division. The Division can allow activities in subsection 6.1.7.6.2.2 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 Division in advance of the 60-day deadline.

6.1.7.6.2.4 Within 60 days after the end of the monitoring period in which the exceedence occurred (unless it already is repeating public education tasks pursuant to section 6.1.7.6.2.5), a non-

transient non-community water system shall deliver the public education materials specified by subsection 6.1.7.6.1 as follows:

6.1.7.6.2.4.1 Post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the system; and

6.1.7.6.2.4.2 Distribute informational pamphlets and/or brochures on lead in drinking water to each person served by the non-transient non-community water system. The Division may allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as it achieves at least the same coverage.

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

6.1.7.6.2.5 A non-transient non-community water system shall repeat the tasks contained in section 6.1.7.6.2.4 at least once during each calendar year in which the system exceeds the lead action level. The Division can allow activities in subsection 6.1.7.6.4 to extend beyond the 60-day requirement if needed for implementation purposes on a case-by-case basis; however, this extension must be approved in writing by the Division in advance of the 60-day deadline.

6.1.7.6.2.6 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 subsection 6.1.7.7. Such a system shall recommence public education in accordance with this section if it subsequently exceeds the lead action level during any monitoring period.

6.1.7.6.2.7 A community water system may apply to the Division, in writing (unless the Division has waived the requirement for prior Division approval), to use only the text specified in section 6.1.7.6.1.1 in lieu of the text in subsections 6.1.7.6.1.1 and 6.1.7.6.1.2 and to perform the tasks listed in subsections 6.1.7.6.2.4 and 6.1.7.6.2.5 in lieu of the tasks listed in subsections 6.1.7.6.2.2 and 6.1.7.6.2.3 if:

6.1.7.6.2.7.1 The system is a facility, such as a prison or a hospital, where the population served is not capable of or is prevented from making improvements to plumbing or installing point of use treatment devices; and,

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

6.1.7.6.2.8 A community water system serving 3,300 or fewer people may limit certain aspects of their public education programs as follows:

6.1.7.6.2.8.1 With respect to the requirements of subsection 6.1.7.6.2.2.6, a system serving 3,300 or fewer people must implement at least one of activities listed in that section.

6.1.7.6.2.8.2 With respect to the requirements of subsection 6.1.7.6.2.2.2, a system serving 3,300 or fewer people may limit the distribution of the public education materials required under that section to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children.

6.1.7.6.2.8.3 With respect to the requirements of subsection 6.1.7.6.2.5, the Division may waive this requirement for systems serving 3,300 or fewer people as long as the system distributes notices to every household served by the system.

6.1.7.6.3 Supplemental monitoring and notification of results. A water system that fails to meet the lead action level on the basis of tap samples collected in accordance with subsection 6.1.7.7 shall offer to sample the tap water of any customer who requests it. The system is not required to pay for collecting or analyzing the sample, nor is the system required to collect and analyze the sample itself.

6.1.7.6.4 Notification of results.

6.1.7.6.4.1 Reporting requirement. All water systems must provide a notice of the individual tap results from the lead tap water monitoring carried out under the requirements of 6.1.7.7 to the persons served by the water system at the specific sample site from which the sample was taken (e.g., the occupants of the residence where the tap was tested).

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

6.1.7.6.4.3 Content. The consumer notice must include the results of the lead tap water monitoring for the tap that was tested, an explanation of the health effects of lead, list steps consumers

can take to reduce exposure to lead in drinking water and contact information for the water utility. The notice must also provide the maximum contaminant level goal and the action level for lead and the definitions for those terms from subsection 4.3.3.3.

6.1.7.6.4.4 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 Division. For example, upon approval by the Division, 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.

6.1.7.7 Monitoring Requirements for Lead and Copper in Tap Water:

6.1.7.7.1 Sample Site Location:

6.1.7.7.1.1 By the applicable date for commencement of monitoring under subsection 6.1.7.7.4.1, each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of this section, and which is sufficiently large enough to ensure that the water system can collect the number of lead and copper tap samples required in subsection 6.1.7.7.3. All large systems shall have established targeted sampling sites by January 1,1992; all medium size systems by July 1, 1992; and all small systems by July 1, 1993. All sites from which first draw samples are collected shall be selected from this pool of targeted sampling sites. Sampling sites may not include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants.

6.1.7.7.1.2 A water system shall use the information on lead, copper, and galvanized steel that is required to collect under subsection 7.2.4 of these regulations (special monitoring for corrosivity characteristics) when conducting a materials evaluation. When an evaluation of the information collected pursuant to subsection 7.2.4 is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in subsection 6.1.7.7.1, the water system shall review the sources of information listed below in order to identify a sufficient number of sampling sites. In addition, the system shall seek to collect such information where possible in the course of its normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities):

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

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

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

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

6.1.7.7.1.3.1 Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

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

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

6.1.7.7.1.4.1 Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

6.1.7.7.1.4.2 are served by a lead service line.

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

representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the system.

6.1.7.7.1.6 The sampling sites selected for a non-transient non-community water system ("tier 1 sampling sites") shall consist of buildings that:

6.1.7.7.1.6.1 Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

6.1.7.7.1.6.2 Are served by a lead service line.

6.1.7.7.1.7 A non-transient non-community water system with insufficient tier 1 sites that meet the targeting criteria in subsection 6.1.7.7.1.6 shall complete its sampling pool with tier 2 sampling sites that contain copper pipes with lead solder installed before 1983. If additional sites are needed to complete the sampling pool, the non-transient non-community water system shall use representative sites throughout the distribution system. For the purpose of this paragraph, a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

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

6.1.7.7.2 Sample Collection Methods:

6.1.7.7.2.1 All tap samples for lead and copper collected in accordance with this section, with the exception of lead service line samples collected under subsection 6.1.7.5.3 and samples collected under subsection 6.1.7.7.2.5, shall be first draw samples.

6.1.7.7.2.2 Each first-draw tap sample for lead and copper shall be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least six hours. First-draw samples from residential housing shall be collected from the cold-water kitchen tap or bathroom sink tap. First-draw samples from a non-residential building shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. Non-first-draw samples collected in lieu of first-draw samples pursuant to subsection 6.1.7.7.2.5 shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. First-draw samples may be collected by the system or the system may allow residents to collect first-draw samples after instructing the residents of the sampling procedures specified in this paragraph. To avoid problems of residents handling nitric acid, acidification of first-draw samples may be done up to 14 days after the sample is collected. After acidification to resolubilize the metals, the sample must stand in the original container for the time specified in the approved EPA method before the sample can be analyzed. If a system allows residents to perform sampling, the system may not challenge, based on the alleged errors in sample collection, the accuracy of sampling results.

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

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

6.1.7.7.2.3.2 Tapping directly into the lead service line; or

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

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

6.1.7.7.2.5 A non-transient non-community water system, or a community water system that meets the criteria of subsection 6.1.7.6.2.7 that does not have enough taps that can supply first-draw

samples as defined in subsection 6.1.7.7.2.2, may apply to the Division in writing to substitute non-first-draw samples. Such systems must collect as many first-draw samples from appropriate taps as possible and identify sampling times and locations that would likely result in the longest standing time for the remaining sites. The Division has the discretion to waive the requirement for prior Division approval of non-first-draw sample sites selected by the system, either through regulation or written notification to the system.

6.1.7.7.2.6 Invalidation of lead and copper tap samples. A sample invalidated under this paragraph does not count toward determining lead or copper 90th percentile levels under subsection 6.1.7.1.1 or toward the minimum monitoring requirements of subsection 6.1.7.7.3.

6.1.7.7.2.6.1 The Division may invalidate a lead or copper tap sample at least if one of the following conditions is met.

6.1.7.7.2.6.1.1 The laboratory establishes that improper sample analysis caused erroneous results.

6.1.7.7.2.6.1.2 The Division determines that the sample was taken from a site that did not meet the site selection criteria of this section.

6.1.7.7.2.6.1.3 The sample container was damaged in transit.

6.1.7.7.2.6.1.4 There is substantial reason to believe that the sample was subject to tampering.

6.1.7.7.2.6.2 The system must report the results of all samples to the Division and all supporting documentation for samples the systems believes should be invalidated.

6.1.7.7.2.6.3 To invalidate a sample under subsection 6.1.7.7.2.6.1 the decision and the rationale for the decision must be documented in writing. The Division may not invalidate a sample solely on the grounds that a follow-up sample result is higher or lower than that of the original sample.

6.1.7.7.2.6.4 The system must collect replacement samples for any samples invalidated under this section if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements of subsection 6.1.7.7.3. Any such replacement samples must be taken as soon as possible, but no later than 20 days after the date the Division invalidates the sample or by the end of the applicable monitoring period, whichever occurs later. Replacement samples taken after the end of the applicable monitoring period shall not also be used to meet the monitoring requirements of a subsequent monitoring period. The replacement samples shall be taken at the same locations as the invalidated samples or, if that is not possible, at locations other than those already used for sampling during the monitoring period.

6.1.7.7.3 Number of Samples: Water systems shall collect at least one sample during each monitoring period specified in subsection 6.1.7.7.4 from the number of sites listed in the second column below ("standard monitoring"). A system conducting reduced monitoring under subsection 6.1.7.7.4.4 shall collect one sample from the number of sites specified in the third column ("reduced monitoring") below during each monitoring period specified in section 6.1.7.7.4.4. Such reduced monitoring sites shall be representative of the sites required for standard monitoring. A public water system that has fewer than five drinking water taps, that can be used for human consumption meeting the sample site criteria of section 6.1.7.7.1 to reach the required number of sample sites listed in subsection 6.1.7.7.3, must collect at least one sample from each tap and then must collect additional samples from those taps on different days during the monitoring period to meet the required number of sites. Alternatively the Division may allow these public water systems to collect a number of samples less than the number of sites specified in subsection 6.1.7.7.3, provided that 100 percent of all taps that can be used for human consumption are sampled. The Division must approve this reduction of the minimum number of samples in writing based on a request from the system or onsite verification by the Division. The Division may specify sampling locations when a system is conducting reduced monitoring. The table is as follows:

System Size (No. people served)	**No. of sites (Standard monitoring)**	**No. of sites (Reduced monitoring)**
>100,000	100	50
10,001-100,000	60	30

3,301-10,000	40	20
501-3,300	20	10
101-500	10	5
<100	5	5

6.1.7.7.4 Timing of Monitoring:

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

System Size (No. people served)	**First six-month monitoring period begins on**
>50,000	January 1, 1992
3,301-50,000	July 1, 1992
<3,300	July 1, 1993

6.1.7.7.4.1.1 All large systems shall monitor during two consecutive six-month periods.

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

6.1.7.7.4.1.2.1 The system exceeds the lead or copper action level and is therefore required to implement the corrosion control treatment requirements under subsection 6.1.7.2 in which case the system shall continue monitoring in accordance with subsection 6.1.7.7.4.2, or

6.1.7.7.4.1.2.2 The system meets the lead and copper action levels during two consecutive six-month monitoring periods, in which case the system may reduce monitoring in accordance with subsection 6.1.7.7.4.4.

6.1.7.7.4.2 Monitoring after Installation of Corrosion Control and Source Water Treatment:

6.1.7.7.4.2.1 Any large system which installs optimal corrosion control treatment pursuant to section 6.1.7.2.4 Step 4 shall monitor during two consecutive six-month periods by the date specified in subsection 6.1.7.2.4 Step 5.

6.1.7.7.4.2.2 Any small or medium-size system which installs optimal corrosion control treatment pursuant to subsection 6.1.7.2.5 Step 5 shall monitor during two consecutive six-month periods by the date specified in subsection 6.1.7.2.5 Step 6.

6.1.7.7.4.2.3 Any system which installs source water treatment pursuant to subsection 6.1.7.4.1 Step 3 shall monitor during two consecutive six-month periods by the date specified in subsection 6.1.7.4.1 Step 4.

6.1.7.7.4.3 Monitoring after Division specifies Water Quality Parameter Values for Optimal Corrosion Control: After the Division specifies the values for water quality control parameters under subsection 6.1.7.3.6, the system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the Division specifies the optimal values under subsection 6.1.7.3.6.

6.1.7.7.4.4 Reduced Monitoring:

6.1.7.7.4.4.1 A small or medium-size water system that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with subsection 6.1.7.7.3, and reduce the frequency of sampling to once per year. A small or medium water system collecting fewer than five samples as specified in subsection 6.1.7.7.3, that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the frequency of sampling to once per year. In no case can the system reduce the number of samples required below the minimum of one sample per available tap. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

6.1.7.7.4.4.2 Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Division under subsection 6.1.7.3.6 during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring to once

per year and to reduce the number of lead and copper samples in accordance with subsection 6.1.7.7.3 if it receives written approval from the Division. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period. The Division shall review monitoring, treatment and other relevant information submitted by the water system in accordance with subsection 6.1.7.10, and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring pursuant to this paragraph. The Division 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.

6.1.7.7.4.4.3 A small or medium-size water system that meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years. Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Division under subsection 6.1.7.3.6 during three consecutive years of monitoring may reduce the frequency of monitoring from annually to once every three years if it receives written approval from the Division. Samples collected once every three years shall be collected no later than every third calendar year. The Division shall review monitoring, treatment and other relevant information submitted by the water system in accordance with subsection 6.1.7.10 and shall notify the system in writing when it determines the system is eligible to reduce the frequency of monitoring to once every three years. The Division 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.

6.1.7.7.4.4.4 A water system that reduces the number and frequency of sampling shall collect these samples from sites included in the pool of targeted sampling sites identified in subsection 6.1.7.7.1. Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August or September unless the Division has approved a different sampling period in accordance with section 6.1.7.7.4.4.4.1.

6.1.7.7.4.4.4.1 The Division, at its discretion, may approve a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. Such a period shall be no longer than four consecutive months and must represent a time of normal operation where the highest levels of lead are most likely to occur. For a non-transient non-community water system that does not operate during the months of June through September, and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, The Division shall designate a period that represents a time of normal operation for the system. This sampling shall begin during the period approved or designated by the Division in the calendar year immediately following the end of the second consecutive six-month monitoring period for systems initiating annual monitoring and during the three-year period following the end of the third consecutive calendar year of annual monitoring for systems initiating triennial monitoring.

6.1.7.7.4.4.4.2 Systems monitoring annually, that have been collecting samples during the months of June through September and that receive Division approval to alter their sample collection period under subsection 6.1.7.7.4.4.4.1, must collect their next round of samples during a time period that ends no later than 21 months after the previous round of sampling. Systems monitoring triennially that have been collecting samples during the months of June through September, and receive Division approval to alter the sampling collection period as per subsection 6.1.7.7.4.4.4.1, must collect their next round of samples during a time period that ends no later than 45 months after the previous round of sampling. Subsequent rounds of sampling must be collected annually or triennially, as required by this section. Small systems with waivers, granted pursuant to subsection 6.1.7.7.6, that have been collecting samples during the months of June through September and receive Division approval to alter their sample collection period under subsection 6.1.7.7.4.4.4.1 must collect their next round of samples before the end of the 9-year period.

6.1.7.7.4.4.5 Any water system that demonstrates for two consecutive 6-month monitoring periods that the tap water lead level computed under subsection 6.1.7.1.1.3 is less than or equal to

0.005 mg/L and the tap water copper level computed under subsection 6.1.7.1.1.3 is less than or equal to 0.65 mg/L may reduce the number of samples in accordance with subsection 6.1.7.7.3 and reduce the frequency of sampling to once every three calendar years.

6.1.7.7.4.4.6 Return to standard monitoring after failure to meet action levels or operate within specified water quality parameters.

6.1.7.7.4.4.6.1 A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action levels shall resume sampling in accordance with subsection 6.1.7.7.4.4.3 and collect the number of samples specified for standard monitoring under subsection 6.1.7.7.3. Such a system shall also conduct water quality parameter monitoring in accordance with subsection 6.1.7.8.2, 6.1.7.8.3 or 6.1.7.8.4 (as appropriate) during the monitoring period in which it exceeded the action level. Any such system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in subsection 6.1.7.7.3 after it has completed two subsequent consecutive 6-month rounds of monitoring that meet the requirements of subsection 6.1.7.7.4.4.1 and/or may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either subsection 6.1.7.7.4.3 or 6.1.7.7.4.4.5.

6.1.7.7.4.4.6.2 Any water system subject to reduced monitoring frequency that fails to meet the lead action level during any four-month monitoring period or that fails to operate at or above the minimum value or within the range of values for the water quality control parameters specified by the Division under section 6.1.7.3.6 for more than nine days in any 6-month period specified in subsection 6.1.7.8.4 shall conduct tap water sampling for lead and copper at the frequency specified in subsection 6.1.7.7.4.3, collect the number of samples specified for standard monitoring under subsection 6.1.7.7.3, and shall resume monitoring for water quality parameters within the distribution system in accordance with subsection 6.1.7.8.4. This standard tap water sampling shall begin no later than the six-month period beginning January 1 of the calendar year following the lead action level exceedence 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:

6.1.7.7.4.4.6.2.1 The system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in subsection 6.1.7.7.3 after it has completed two subsequent 6-month rounds of monitoring that meet the criteria of section 6.1.7.7.4.4.2 and the system has received written approval from the Division that it is appropriate to resume reduced monitoring on the annual frequency. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

6.1.7.7.4.4.6.2.2 The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either subsections 6.1.7.7.4.4.3 or 6.1.7.7.4.4.5 and the system has received written approval from the Division that it is appropriate to resume triennial monitoring.

6.1.7.7.4.4.6.2.3 The system may reduce the number of water quality parameter tap water samples required in accordance with subsection 6.1.7.8.5.1 and the frequency with which it collects such samples in accordance with subsection 6.1.7.8.5.2. Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of subsection 6.1.7.8.5.2, that it has re-qualified for triennial monitoring.

6.1.7.7.4.4.7 Any water system subject to a reduced monitoring frequency under subsection 6.1.7.7.4.4 shall notify the Division in writing in accordance with subsection 6.1.7.10.1.3 of any upcoming long-term change in treatment or addition of a new source as described in that section. The Division must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Division may require the system to resume sampling in accordance with subsection 6.1.7.7.4.3 and collect the number of samples specified for standard monitoring under subsection 6.1.7.7.3 or take other appropriate steps such as increased water quality parameter monitoring or re-evaluation of its corrosion control treatment given the potentially different water quality considerations.

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

6.1.7.7.6 Monitoring Waivers for Small Systems: Any small system that meets the criteria of this paragraph may apply to the Division to reduce the frequency of monitoring for lead and copper under this section to once every nine years (i.e., a "full waiver") if it meets all of the materials criteria specified in subsection 6.1.7.7.6.1 and all of the monitoring criteria specified in subsection 6.1.7.7.6.2. If Division regulations permit, any small system that meets the criteria in subsections 6.1.7.7.6.1 and 6.1.7.7.6.2 only for lead, or only for copper, may apply to the Division for a waiver to reduce the frequency of tap water monitoring to once every nine years for that contaminant only (i.e., a "partial waiver").

6.1.7.7.6.1 Materials Criteria: The system must demonstrate that its distribution system and service lines and all drinking water supply plumbing, including plumbing conveying drinking water within all residences and buildings connected to the system, are free of lead-containing materials and/or copper-containing materials, as those terms are defined in this paragraph, as follows:

6.1.7.7.6.1.1 Lead. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for lead (i.e., a "lead waiver"), the water system must provide certification and supporting documentation to the Division that the system is free of all lead-containing materials as follows:

6.1.7.7.6.1.1.1 It contains no plastic pipe which contain lead plasticizers, or plastic service lines which contain lead plasticizers; and

6.1.7.7.6.1.1.2 It is free of lead service lines, lead pipes, lead soldered pipe joints, and leaded brass or bronze alloy fittings and fixtures, unless such fittings and fixtures meet the specifications of any standard established pursuant to 42 U.S.C. 300g-6(e) (Safe Drinking Water Act section 1417(e)).

6.1.7.7.6.1.2 Copper. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for copper (i.e., a "copper waiver"), the water system must provide certification and supporting documentation to the Division that the system contains no copper pipes or copper service lines.

6.1.7.7.6.2 Monitoring Criteria for Waiver Issuance: The system must have completed at least one six-month round of standard tap water monitoring for lead and copper at sites approved by the Division and from the number of sites required by subsection 6.1.7.7.3 and demonstrate that the 90th percentile levels for any and all rounds of monitoring conducted since the system became free of all lead-containing and/or copper-containing materials, as appropriate, meet the following criteria.

6.1.7.7.6.2.1 Lead levels. To qualify for a full waiver, or a lead waiver, the system must demonstrate that the 90th percentile lead level does not exceed 0.005 mg/L.

6.1.7.7.6.2.2 Copper levels. To qualify for a full waiver, or a copper waiver, the system must demonstrate that the 90th percentile copper level does not exceed 0.65 mg/L.

6.1.7.7.6.3 Division Approval of Waiver Application: The Division shall notify the system of its waiver determination, in writing, setting forth the basis of its decision and any condition of the waiver. As a condition of the waiver, the Division may require the system to perform specific activities (e.g., limited monitoring, periodic outreach to customers to remind them to avoid installation of materials that void the waiver) to avoid the risk of lead or copper concentration of concern in tap water. The small system must continue monitoring for lead and copper at the tap as required by subsections 6.1.7.7.4.1 through 6.1.7.7.4.4, as appropriate, until it receives written notification from the Division that the waiver has been approved.

6.1.7.7.6.4 Monitoring frequency for systems with waivers.

6.1.7.7.6.4.1 A system with a full waiver must conduct tap water monitoring for lead and copper in accordance with subsection 6.1.7.7.4.4.4 at the reduced number of sampling sites identified in subsection 6.1.7.7.3 at least once every nine years and provide the materials certification specified in subsection 6.1.7.7.6.1 for both lead and copper to the Division along with the monitoring results. Samples collected every nine years shall be collected no later than every ninth calendar year.

6.1.7.7.6.4.2 A system with a partial waiver must conduct tap water monitoring for the waived contaminant in accordance with section 6.1.7.4.4.4 at the reduced number of sample sites specified in subsection 6.1.7.7.3 at least once every nine years and provide the materials certification specified in subsection 6.1.7.7.6.1 pertaining to the waived contaminant along with the monitoring results. Such a system also must continue to monitor for the non-waived contaminant in accordance with subsections 6.1.7.7.4.1 through 6.1.7.7.4.4, as appropriate.

6.1.7.7.6.4.3 Any water system with a full or partial waiver shall notify the Division in writing in accordance with subsection 6.1.7.10.1.3 of any upcoming long-term change in treatment or addition of a new source, as described in that section. The Division must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Division has the authority to require the system to modify waiver conditions (e.g., require re-certification that the system is free of lead-containing and/or copper-containing materials or require additional round(s) of monitoring), if it deems such modifications are necessary to address treatment or source water changes at the system.

6.1.7.7.6.4.4 If a system with a full or partial waiver becomes aware that it is no longer free of lead-containing or copper-containing materials, as appropriate, (e.g., as a result of new construction or repairs), the system shall notify the Division in writing no later than 60 days after becoming aware of such a change.

6.1.7.7.6.5 Continued Eligibility: If the system continues to satisfy the requirements of subsection 6.1.7.7.6.4, the waiver will be renewed automatically, unless any of the conditions listed in subsections 6.1.7.7.6.5.1 through 6.1.7.7.6.5.3 occurs. A system whose waiver has been revoked may re-apply for a waiver at such time as it again meets the appropriate materials and monitoring criteria of subsections 6.1.7.7.6.1 and 6.1.7.7.6.2.

6.1.7.7.6.5.1 A system with a full waiver or a lead waiver no longer satisfies the materials criteria of subsection 6.1.7.7.6.1.1 or has a 90th percentile level greater than 0.005 mg/L.

6.1.7.7.6.5.2 A system with a full waiver or a copper waiver no longer satisfies the materials criteria of subsection 6.1.7.7.6.1.2 or has a 90th percentile copper level greater than 0.65 mg/L.

6.1.7.7.6.5.3 The Division notifies the system, in writing, that the waiver has been revoked, setting forth the basis of its decision.

6.1.7.7.6.6 Requirements Following Waiver Revocation: A system whose full or partial waiver has been revoked by the Division is subject to the corrosion control treatment and lead and copper tap water monitoring requirements, as follows:

6.1.7.7.6.6.1 If the system exceeds the lead and/or copper action level, the system must implement corrosion control treatment in accordance with the deadlines specified in section 6.1.7.2.5, and any other applicable requirements of this section.

6.1.7.7.6.6.2 If the system meets both the lead and copper action level, the system must monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sample sites specified in subsection 6.1.7.7.3.

6.1.7.7.6.7 Pre-existing Waivers: Small system waivers approved by the Division in writing prior to April 11, 2000 shall remain in effect under the following conditions:

6.1.7.7.6.7.1 If the system has demonstrated that it is both free of lead-containing and copper-containing materials, as required by subsection 6.1.7.7.6.1 and that its 90th percentile lead levels and 90th percentile copper levels meet the criteria of subsection 6.1.7.7.6.2, the waiver remains in effect so long as the system continues to meet the waiver eligibility criteria of subsection 6.1.7.7.6.5. The first round of tap monitoring conducted pursuant to subsection 6.1.7.7.6.4 shall be completed no later than nine years after the last time the system has monitored for lead and copper at the tap.

6.1.7.7.6.7.2 If the system has met the materials criteria of subsection 6.1.7.7.6.1 but has not met the monitoring criteria of subsection 6.1.7.7.6.2, the system shall conduct a round of monitoring for lead and copper at the tap demonstrating that it meets the criteria of subsection 6.1.7.7.6.2, no later than September 30, 2003. Thereafter, the waiver shall remain in effect as long as the system meets the continued eligibility criteria of subsection 6.1.7.7.6.5. The first round of tap water monitoring conducted pursuant to subsection

6.1.7.7.6.4 shall be completed no later than nine years after the round of monitoring conducted pursuant to subsection 6.1.7.7.6.2.

6.1.7.8 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 this section. The requirements of this section are summarized in the table at the end of this section.

6.1.7.8.1 General Requirements:

6.1.7.8.1.1 Sample Collection Methods:

6.1.7.8.1.1.1 Tap samples shall be representative of water quality throughout the distribution system taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Tap sampling under this section is not required to be conducted at taps targeted for lead and copper sampling under subsection 6.1.7.7.1. (NOTE: Systems may find it convenient to conduct tap sampling for water quality parameters at sites used for coliform sampling under Section 5.0.)

6.1.7.8.1.1.2 Samples collected at the entry point(s) to the distribution system shall be from locations representative of each source after treatment. If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

6.1.7.8.1.2 Number of Samples:

6.1.7.8.1.2.1 Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under subsections 6.1.7.8.2 and 6.1.7.8.5 from the following number of sites:

System Size (No. people served)	**No. sites for water quality parameters**
>100,000	25
10,001-100,000	10
3,301-10,000	3
501-3,300	2
101-500	1
<100	1

6.1.7.8.1.2.2 Except as provided in subsection 6.1.7.8.3.3, systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in subsection 6.1.7.8.2. During each monitoring period specified in subsections 6.1.7.8.3 through 6.1.7.8.5, systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.

6.1.7.8.2 Initial Sampling: All large water systems shall measure the applicable water quality parameters as specified below at taps and at each entry point to the distribution system during each six-month monitoring period specified in subsection 6.1.7.7.4.1. All small and medium-size systems shall measure the applicable water quality parameters at the locations specified below during each six-month monitoring period specified in subsection 6.1.7.7.4.1 during which the system exceeds the lead or copper action levels.

6.1.7.8.2.1 At taps:

pH;

Alkalinity;

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

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

Calcium;

Conductivity; and

Water Temperature.

6.1.7.8.2.2 At each entry point to the distribution system, all of the applicable parameters listed in subsection 6.1.7.8.2.1.

6.1.7.8.3 Monitoring after Installation of Corrosion Control: Any large system which installs optimal corrosion control treatment pursuant to subsection 6.1.7.2.4 Step 4 shall measure the water quality parameters at the locations and frequencies specified below during each six-month monitoring period specified in subsection 6.1.7.7.4.2.1. Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each six-month monitoring period specified in subsection 6.1.7.7.4.2.2 in which the system exceeds the lead or copper action level.

6.1.7.8.3.1 At taps two samples for:

pH;

Alkalinity;

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

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

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

6.1.7.8.3.2 Except as provided in subsection 6.1.7.8.3.3 at each entry point to the distribution system, one sample every two weeks (bi-weekly) for:

pH;

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

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

6.1.7.8.3.3 Any groundwater system can limit entry point sampling described in subsection 6.1.7.8.3.2 to those entry points that are representative of water quality and treatment conditions throughout the system. If water from untreated groundwater sources mixes with water from treated groundwater sources, the system must monitor for water quality parameters both at representative entry points receiving treatment and representative points receiving no treatment. Prior to the start of any monitoring under this paragraph, the system shall provide to the Division written information identifying the selected entry points and documentation, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

6.1.7.8.4 Monitoring after Division Specifies Water Quality Parameter Values for Optimal Corrosion Control: After the Division specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under subsection 6.1.7.3.6, all large systems shall measure the applicable water quality parameters in accordance with subsection 6.1.7.8.3 and determine compliance with the requirements of subsection 6.1.7.3.7 every six months with the first six-month period to begin on either January 1 or July 1, whichever comes first, after the Division specifies the optimal values under subsection 6.1.7.3.6. Any small or medium-size system shall conduct such monitoring during each six-month period specified in this paragraph in which the system exceeds the lead or copper action level. For any such small and medium-size system that is subject to a reduced monitoring frequency pursuant to subsection 6.1.7.7.4.4 at the time of the action level exceedance, the start of the applicable six-month period under this paragraph shall coincide with the start of the applicable monitoring period under subsection 6.1.7.7.4.4. Compliance with the Division-designated optimal water quality parameter values shall be determined as specified under subsection 6.1.7.3.7.

6.1.7.8.5 Reduced Monitoring:

6.1.7.8.5.1 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 subsection 6.1.7.8.4 shall continue monitoring at the entry point(s) to the distribution system as specified in subsection 6.1.7.8.3.2. 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. people served)	**Reduced no. of sites for water quality parameters**

>100,000	10
10,001-100,000	7
3,301-10,000	3
501-3,300	2
101-500	1
<100	1

6.1.7.8.5.2 Frequency of monitoring

6.1.7.8.5.2.1 Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Division under subsection 6.1.7.3.6 during three consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in subsection 6.1.7.8.5.1 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 Division under subsection 6.1.7.3.6, during three consecutive years of annual monitoring under this paragraph may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in subsection 6.1.7.8.5.1 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.

6.1.7.8.5.2.2 A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in subsection 6.1.7.8.5.1 to every three years if it demonstrates during two consecutive monitoring periods that its tap water lead level at the 90th percentile is less than or equal to the PQL (Practical Quantitation Level) for lead specified in subsection 6.1.7.12, that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L for copper in subsection 6.1.7.1.3.2, and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Division under subsection 6.1.7.3.6. Monitoring conducted every three years shall be done no later than every third calendar year.

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

6.1.7.8.5.4 Any water system subject to reduced monitoring frequency that fails to operate within the range of values for the water quality parameters specified by the Division under section 6.1.7.3.6 for more than nine days in any six-month period specified in subsection 6.1.7.3.7 shall resume distribution system tap water sampling in accordance with the number and frequency requirements in subsection 6.1.7.8.4. Such a system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites specified in section 6.1.7.8.5.1 after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of that section and/or may resume triennial monitoring for water quality parameters at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either subsections 6.1.7.8.5.2.1 or 6.1.7.8.5.2.2.

6.1.7.8.6 Additional Monitoring by Systems: The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the Division in making any determinations (i.e., determining concentrations of water quality parameters) under this section or section 6.1.7.3.

SUMMARY OF MONITORING REQUIREMENTS FOR WATER QUALITY PARAMETERS[1]

Monitoring	**Parameters[2]**	**Location**	**Frequency**

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

[1] Table is for illustrated purposes; consult the text of this section for precise regulatory requirements.

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

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

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

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

[6] Groundwater 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 6 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 Division under subsection 6.1.7.8 as representing optimal corrosion control during two consecutive six-month monitoring periods.

6.1.7.9 Monitoring Requirements for Lead and Copper in Source Water:

6.1.7.9.1 Sample Location Collection Methods, and Number of samples:

6.1.7.9.1.1 A water system that fails to meet the lead or copper action level on the basis of tap samples collected in accordance with subsection 6.1.7.7 shall collect lead and copper source

water samples in accordance with the requirements regarding sample location, number of samples, and collection methods:

6.1.7.9.1.1.1 Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). The system shall take one sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

6.1.7.9.1.1.2 Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point). The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. NOTE: For the purpose of this paragraph, surface water systems include systems with a combination of surface and groundwater sources.

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

6.1.7.9.1.1.4 The Division may reduce the total number of samples which must be analyzed by allowing the use of compositing. Compositing of samples must be done by certified laboratory personnel. Composite samples from a maximum of five samples are allowed, provided that if the lead concentration in the composite sample is greater than or equal to 0.001 mg/L or the copper concentration is greater than or equal to 0.160 mg/L, then either:

6.1.7.9.1.1.4.1 A follow-up sample shall be taken and analyzed within 14 days at each sampling point included in the composite; or

6.1.7.9.1.1.4.2 If duplicates of or sufficient quantities from the original samples from each sampling point used in the composite are available, the system may use these instead of resampling.

6.1.7.9.1.2 Where the results of sampling indicate an exceedance of maximum permissible source water levels established under subsection 6.1.7.4.2.4, the Division may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point. If a Division-required confirmation sample is taken for lead or copper, then the results of the initial and confirmation sample shall be averaged in determining compliance with the Division-specified maximum permissible levels. Any sample value below the detection limit shall be considered to be zero. Any value above the detection limit but below the PQL shall either be considered as the measure value or be considered one-half the PQL.

6.1.7.9.2 Monitoring Frequency after System Exceeds Tap Water Action Level: Any system which exceeds the lead or copper action level at the tap shall collect one source water sample from each entry point to the distribution system within six months after the end of the monitoring period during which the lead or copper action level was exceeded. For monitoring periods that are annual or less frequent, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or if the Division has established an alternate monitoring period, the last day of that period.

6.1.7.9.3 Monitoring Frequency after Installation of Source Water Treatment: Any system which installs source water treatment pursuant to subsection 6.1.7.4.1 Step 3 shall collect an additional source water sample from each entry point to the distribution system during two consecutive six-month monitoring periods by the deadline specified in subsection 6.1.7.4.1 Step 4.

6.1.7.9.4 Monitoring Frequency after Division Specifies Maximum Permissible Source Water Levels or Determines that Source Water Treatment is not Needed:

6.1.7.9.4.1 A system shall monitor at the frequency specified below in cases where the Division specifies maximum permissible source water levels under subsection 6.1.7.4.2.4 or determines that the system is not required to install source water treatment under subsection 6.1.7.4.2.2.

6.1.7.9.4.1.1 A water system using only groundwater shall collect samples once during the three-year compliance period (as that term is defined in section 1.0) in effect when the applicable Division determination under subsection 6.1.7.9.4.1 is made. Such systems

shall collect samples once during each subsequent compliance period. Triennial samples shall be collected every third calendar year.

6.1.7.9.4.1.2 A water system using surface water (or a combination of surface and groundwater) shall collect samples once during each calendar year, the first annual monitoring period to begin during the year in which the applicable Division determination is made under subsection 6.1.7.9.4.1.

6.1.7.9.4.2 A system is not required to conduct source water sampling for lead and/or copper if the system meets the action level for the specific contaminant in tap water samples during the entire source water sampling period applicable to the system under subsection 6.1.7.9.4.1.1 or 6.1.7.9.4.1.2.

6.1.7.9.5 Reduced Monitoring Frequency:

6.1.7.9.5.1 A water system using only groundwater may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle (as that term is defined in section 1.0) provided that the samples are collected no later than every ninth calendar year and if the system meets one of the following criteria:

6.1.7.9.5.1.1 The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Division in subsection 6.1.7.4.2.4 during at least three consecutive compliance periods under subsection 6.1.7.9.4.1; or

6.1.7.9.5.1.2 The Division has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive compliance periods in which sampling was conducted under section 6.1.7.9.4.1, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

6.1.7.9.5.2 A water system using surface water (or a combination of surface and ground water) may reduce the monitoring frequency in subsection 6.1.7.9.4.1 to once during each nine-year compliance cycle (as that term is defined in section 1.0) provided that the samples are collected no later than every ninth calendar year and if the system meets one of the following criteria:

6.1.7.9.5.2.1 The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Division in subsection 6.1.7.4.2.4 during at least three consecutive years; or

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

6.1.7.10 Reporting Requirements: All water systems shall report all of the following information to the Division in accordance with this section.

6.1.7.10.1 Reporting Requirements for Tap Water Monitoring for Lead and Copper and for Water Quality Parameter Monitoring:

6.1.7.10.1.1 Except as provided in subsection 6.1.7.10.1.1.8, a water system shall report the information specified below for all tap water samples specified in 6.1.7.7 and for all water quality parameter samples specified in 6.1.7.8 within the first 10 days following the end of each applicable monitoring period specified in subsections 6.1.7.7, and 6.1.7.8, (i.e., every six-months, annually, every 3 years or every 9 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 the period specified in sections 6.1.7.7 and 6.1.7.8.

6.1.7.10.1.1.1 The results of all tap samples for lead and copper including the location of each site and the criteria under subsections 6.1.7.7.1.3, 6.1.7.7.1.4, 6.1.7.7.1.5, 6.1.7.7.1.6 or 6.1.7.7.1.7 under which the site was selected for the system's sampling pool;

6.1.7.10.1.1.2 Documentation for each tap water lead or copper sample for which the water system requests invalidation pursuant to subsection 6.1.7.7.2.6;

6.1.7.10.1.1.3 [Reserved]

6.1.7.10.1.1.4 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 subsection 6.1.7.1.1.3) unless the Division calculates the 90th percentile lead and copper levels under subsection 6.1.7.10.8;

6.1.7.10.1.1.5 With the exception of initial tap sampling conducted pursuant to subsection 6.1.7.7.4.1 the system shall designate any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;

6.1.7.10.1.1.6 The results of all tap samples for pH, and where applicable, alkalinity, calcium, conductivity, temperature, and orthophosphate or silica collected under subsections 6.1.7.8.2 through 6.1.7.8.5.

6.1.7.10.1.1.7 The results of all samples collected at the entry point(s) to the distribution system for applicable water quality parameters under subsections 6.1.7.8.2 through 6.1.7.8.5.

6.1.7.10.1.1.8 A water system shall report the results of all water quality parameter samples collected under subsections 6.1.7.8.3 through 6.1.7.8.6 during each six-month monitoring period specified in subsection 6.1.7.8.4 within the first ten days following the end of the monitoring period unless the Division has specified a more frequent reporting requirement.

6.1.7.10.1.2 For a non-transient non-community water system, or a community water system meeting the criteria of subsection 6.1.7.6.2.7, that does not have enough taps that can provide first-draw samples, the system must either:

6.1.7.10.1.2.1 Provide written documentation to the Division identifying standing times and locations for enough non-first-draw samples to make up its sampling pool under section 6.1.7.7.2.5 by the start of the first applicable monitoring period under subsection 6.1.7.7.4 that commences after April 11, 2000, unless the Division has waived prior Division approval of non-first-draw sample sites selected by the system pursuant to subsection 6.1.7.7.2.5; or

6.1.7.10.1.2.2 If the Division has waived prior approval of non-first-draw sample sites selected by the system, identify, in writing, each site that did not meet the six-hour minimum standing time and the length of standing time for that particular substitute sample collected pursuant to subsection 6.1.7.7.2.5 and include this information with the lead and copper tap sample results required to be submitted pursuant to subsection 6.1.7.10.1.1.1.

6.1.7.10.1.3 At a time specified by the Division, or if no specific time is designated by the Division, then as early as possible prior to the addition of a new source or any long-term change in water treatment, a water system deemed to have optimized corrosion control under subsection 6.1.7.2.2.3, a water system subject to reduced monitoring pursuant to subsection 6.1.7.7.4.4, or a water system subject to a monitoring waiver pursuant to subsection 6.1.7.7.7, shall submit written documentation to the Division describing the change or addition. The Division must review and approve the addition of the new source or long-term change in treatment before it is implemented by the water system. Examples of long-term treatment changes include the addition of a new treatment process or modification of an existing treatment process. Examples of modifications include switching secondary disinfectants, switching coagulants (e.g., orthophosphate to blended phosphate). Long-term changes can include dose changes to existing chemicals if the system is planning long-term changes to its finished pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily raw water quality changes.

6.1.7.10.1.4 Any small system applying for a monitoring waiver under subsection 6.1.7.7.6, or subject to a waiver granted pursuant to subsection 6.1.7.7.6.3, shall provide the following information to the Division in writing by the specified deadline:

6.1.7.10.1.4.1 By the start of the first applicable monitoring period in subsection 6.1.7.7.4, any small water system applying for a monitoring waiver shall provide the documentation required to demonstrate that it meets the waiver criteria of subsections 6.1.7.7.6.1 and 6.1.7.7.6.2.

6.1.7.10.1.4.2 No later than nine years after the monitoring previously conducted pursuant to subsection 6.1.7.7.6.2 or subsection 6.1.7.7.6.4.1, each small system desiring to maintain its monitoring waiver shall provide the information required by subsections 6.1.7.7.6.4.1 and 6.1.7.7.6.4.2.

6.1.7.10.1.4.3 No later than 60 days after it becomes aware that it is no longer free of lead-containing and/or copper-containing material, as appropriate, each small system with a monitoring waiver shall provide written notification to the Division, setting forth the circumstances resulting in the lead-containing and/or copper-containing materials being

introduced into the system and what corrective action, if any, the system plans to remove these materials.

6.1.7.10.1.4.4 By October 10, 2003, any small system with a waiver granted prior to April 11, 2000 and that has not previously met the requirements of subsection 6.1.7.7.6.2 shall provide the information required by that subsection.

6.1.7.10.1.5 Each groundwater system that limits water quality parameter monitoring to a subset of entry points under subsection 6.1.7.8.3.3 shall provide, by the commencement of such monitoring, written correspondence to the Division that identifies the selected entry points and includes the information sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

6.1.7.10.2 Source Water Monitoring Reporting Requirements:

6.1.7.10.2.1 A water system shall report the sampling results for all source water samples collected in accordance with section 6.1.7.9 within the first 10 days following the end of each source water monitoring period (i.e., annually, per compliance period, per compliance cycle) specified in section 6.1.7.9.

6.1.7.10.2.2 With the exception of the first round of source water sampling conducted pursuant to section 6.1.7.9.2, the system shall specify any site which was not sampled during previous monitoring periods, and include an explanation of why the sampling point has changed.

6.1.7.10.3 Corrosion Control Treatment Reporting Requirements: By the applicable dates under section 6.1.7.2, systems shall report the following information:

6.1.7.10.3.1 for systems demonstrating that they have already optimized corrosion control, information required in subsections 6.1.7.2.2.2 or 6.1.7.2.2.3.

6.1.7.10.3.2 for systems required to optimize corrosion control, their recommendation regarding optimal corrosion control treatment under subsection 6.1.7.3.1.

6.1.7.10.3.3 for systems required to evaluate the effectiveness of corrosion control treatments under subsection 6.1.7.3.3, the information required by that paragraph.

6.1.7.10.3.4 for systems required to install optimal corrosion control designated by the Division under subsection 6.1.7.3.4, a letter certifying that the system has completed installing that treatment.

6.1.7.10.4 Source Water Treatment Reporting Requirements: By the applicable dates in subsection 6.1.7.4, systems shall provide the following information to the Division:

6.1.7.10.4.1 if required under subsection 6.1.7.4.2.1 their recommendation regarding source water treatment;

6.1.7.10.4.2 for systems required to install source water treatment under subsection 6.1.7.4.2.2, a letter certifying that the system has completed installing the treatment designated by the Division within 24 months after the Division designated the treatment.

6.1.7.10.5 Lead Service Line Replacement Reporting Requirements: Systems shall report the following information to the Division to demonstrate compliance with the requirements of subsection 6.1.7.5:

6.1.7.10.5.1 No later than 12 months after the end of the monitoring period in which a system exceeds the lead action level in sampling referred to in subsection 6.1.7.5.1, the system must submit written documentation to the Division of the material evaluation conducted as required in subsection 6.1.7.7.1, identify the initial number of lead service lines in its distribution system at the time the system exceeds the lead action level, and provide the system's schedule for annually replacing at least 7 percent of the initial number of lead service lines in its distribution system.

6.1.7.10.5.2 No later than 12 months after the end of the monitoring period in which a system exceeds the lead action level in sampling referred to in subsection 6.1.7.5.1, and every 12 months thereafter, the system shall demonstrate to the Division in writing that the system has either:

6.1.7.10.5.2.1 Replaced in the previous 12 months at least 7 percent of the initial lead service lines (or a greater number of lines specified by the Division under subsection 6.1.7.5.5 in its distribution system; or

6.1.7.10.5.2.2 Conducted sampling which demonstrates that the lead concentration in all service lines samples from an individual line(s), taken pursuant to subsection 6.1.7.7.2.3, is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced and/or which meet the criteria in subsection 6.1.7.5.3 shall equal at least 7 percent of the initial

number of lead lines identified under subsection 6.1.7.10.5.1 (or the percentage specified by the Division under subsection 6.1.7.5.5.

6.1.7.10.5.3 The annual letter submitted to the Division under subsection 6.1.7.10.5.2 shall contain the following information:

6.1.7.10.5.3.1 the number of lead service lines scheduled to be replaced during the previous year of the system's replacement schedule;

6.1.7.10.5.3.2 the number and location of each lead service line replaced during the previous year of the system's replacement schedule;

6.1.7.10.5.3.3 if measured, the water lead concentration and location of each lead service line sampled, the sampling method, and the date of sampling.

6.1.7.10.5.4 Any system which collects lead service line samples following partial lead service line replacement required by subsection 6.1.7.5 shall report the results to the Division within the first ten days of the month following the month in which the system receives the laboratory results, or as specified by the Division. The Division, at its discretion may eliminate this requirement to report these monitoring results. Systems shall also report any additional information as specified by the Division, and in a time and manner prescribed by the Division, to verify that all partial lead service line replacement activities have taken place.

6.1.7.10.6 Public Education Program Reporting Requirements:

6.1.7.10.6.1 Any water system that is subject to the public education requirements in subsection 6.1.7.6 shall, within ten days after the end of each period in which the system is required to perform public education tasks in accordance with subsection 6.1.7.6.2, send written documentation to the Division that contains:

6.1.7.10.6.1.1 A demonstration that the system has delivered the public education materials that meet the content requirements in subsection 6.1.7.6.1 and the delivery requirements in subsection 6.1.7.6.2; and

6.1.7.10.6.1.2 A list of all newspapers, radio stations, television stations, and facilities and organizations to which the system delivered public education materials during the period in which the system was required to perform public education tasks.

6.1.7.10.6.2 Unless required by the Division, a system that previously has submitted the information required in subsection 6.1.7.10.6.1.2 need not resubmit the information required by subsection 6.1.7.10.6.1.2, as long as there have been no changes in the distribution list and the system certifies that the public education materials were distributed to the same list submitted previously.

6.1.7.10.6.3 No later than 3 months following the end of the monitoring period, each system must mail a sample copy of the consumer notification of tap results to the Division along with a certification that the notification has been distributed in a manner consistent with the requirements of subsection 6.1.7.6.4.

6.1.7.10.7 Reporting of Additional Monitoring Data: Any system which collects sampling data in addition to that required by this section shall report the results to the Division within the first ten days following the end of the applicable monitoring period under subsections 6.1.7.7, 6.1.7.8 and 6.1.7.9 during which the samples are collected.

6.1.7.10.8 Reporting of the 90th percentile lead and copper concentrations where the Division 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 subsection 6.1.7.10.1.1.4 if:

6.1.7.10.8.1 The Division has previously notified the water system that it will calculate the water system's 90th percentile lead and copper concentrations, based on the lead and copper tap results submitted pursuant to subsection 6.1.7.10.8.2.1, and has specified a date before the end of the applicable monitoring period by which the system must provide the results of lead and copper tap water samples;

6.1.7.10.8.2 The system has provided the following information to the Division by the date specified in subsection 6.1.7.10.8.1:

6.1.7.10.8.2.1 The results of all tap samples for lead and copper including the location of each site and the criteria under subsections 6.1.7.7.1.3, 6.1.7.7.1.4, 6.1.7.7.1.5, 6.1.7.7.1.6

and/or 6.1.7.7.1.7 under which the site was selected for the system's sampling pool, pursuant to subsection 6.1.7.10.1.1.1; and

6.1.7.10.8.2.2 An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation why sampling sites have changed; and

6.1.7.10.8.3 The Division has provided the results of the 90th percentile lead and copper calculations, in writing, to the water system before the end of the monitoring period.

6.1.7.11 Recordkeeping Requirements: Any system subject to the requirements of this section shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, Division determinations, and any other information required by subsections 6.1.7.2 through 6.1.7.9. Each water system shall retain the records required by this section for no fewer than 12 years.

6.1.7.12 Analytical Methodology: Analysis for compliance with this section shall be conducted in accordance with 40 CFR 141.89. Copies may be obtained from the Office of Drinking Water.

6.2 Organic Chemical Requirements:

6.2.1 PMCLs: The following are the organic PMCLs (mg/L-milligrams per liter). Compliance is determined pursuant to subsections 6.2.2, 6.2.3, and 6.2.4.

6.2.1.1 The following maximum contaminant levels for synthetic organic contaminants apply to community water systems and non-transient, non-community water systems:

Pesticides and PCBs

Contaminant	**MCL**
Alachlor	0.002 mg/L
Atrazine	0.003 mg/L
Benzo(a)pyrene	0.0002 m g/L
Carbofuran	0.04 mg/L
Chlordane	0.002 mg/L
Dalapon	0.2 mg/L
Di(2-ethylhexyl) adipate	0.4 mg/L
Di(2-ethylhexyl) phthalate	0.006 mg/L
Dibromochloropropane	0.0002 mg/L
Dinoseb	0.007 mg/L
Diquat	0.02 mg/L
2,4-D	0.07 mg/L
Endothall	0.1 mg/L
Endrin	0.002 mg/L
Ethylenedibromide (EDB)	0.00005 mg/L
Glyphosate	0.7 mg/L
Heptachlor	0.0004 mg/L
Heptachlor epoxide	0.0002 mg/L
Hexachlorobenzene	0.001 mg/L
Hexachlorocyclopentadiene	0.05 mg/L
Lindane	0.0002 mg/L
Methoxychlor	0.04 mg/L
Oxamyl (Vydate)	0.2 mg/L

~~Pentachlorophenol~~	~~0.001 mg/L~~
~~Picloram~~	~~0.5 mg/L~~
~~Polychlorinated biphenyls (PCBs)~~	~~0.0005 mg/L~~
~~Simazine~~	~~0.004 mg/L~~
~~2,3,7,8-TCDD (Dioxin)~~	~~3×10^{-8} mg/L~~
~~Toxaphene~~	~~0.003 mg/L~~
~~2,4,5-TP (Silvex)~~	~~0.05 mg/L~~

~~6.2.1.2 Disinfection Byproducts (DBPs)~~

~~Contaminant~~	~~MCL~~
~~Total Trihalomethanes (TTHMs)~~	~~0.080 mg/L~~
~~Haloacetic acids (five) (HAA5)~~	~~0.060 mg/L~~
~~Bromate~~	~~0.010 mg/L~~
~~Chlorite~~	~~1.0 mg/L~~

~~6.2.1.2.1 Maximum Contaminant Level Goals for disinfection byproducts.~~

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

~~6.2.1.3 Volatile Synthetic Organic Chemicals (VOCs)~~

~~Contaminant~~	~~MCL~~
~~Benzene~~	~~0.005 mg/L~~
~~Carbon Tetrachloride~~	~~0.005 mg/L~~
~~1,2-Dichlorobenzene~~	~~0.6 mg/L~~
~~1,4-Dichlorobenzene~~	~~0.075 mg/ L~~
~~1,2 Dichloroethane~~	~~0.005 mg/L~~
~~1,1 Dichloroethylene~~	~~0.007 mg/L~~
~~Cis-1,2-Dichloroethylene~~	~~0.07 mg/L~~
~~Trans 1,2 Dichloroethylene~~	~~0.1 mg/L~~
~~Dichloromethane~~	~~0.005 mg/L~~
~~1,2 Dichloropropane~~	~~0.005 mg/L~~

~~Ethylbenzene~~	~~0.7 mg/L~~
~~Methyl tert Butyl Ether (MTBE)~~	~~0.01 mg/L~~
~~Monochlorobenzene~~	~~0.1 mg/L~~
~~Styrene~~	~~0.1 mg/L~~
~~Tetrachloroethylene~~[1,2,3]	~~0.001 mg/L~~
~~Toluene~~	~~1 mg/L~~
~~1,2,4-Trichlorobenzene~~	~~0.07 mg/L~~
~~1,1,1-Trichloroethane~~	~~0.2 mg/L~~
~~1,1,2-Trichloroethane~~	~~0.005 mg/L~~
~~Trichloroethylene~~[1,2,3]	~~0.001 mg/L~~
~~Vinyl Chloride~~[1,2,3]	~~0.001 mg/L~~
~~Xylenes (total)~~	~~10 mg/L~~

~~[1]The MCL for these compounds will be lowered to 0.001 mg/L effective January 1, 2013.~~

~~[2]Systems that meet the federal MCL of 0.005 mg/L on January 1, 2013 effective date yet do not comply with the 0.001 mg/L shall have until January 1, 2015 to reach compliance.~~

~~[3]For enforcement purposes during the transition period between January 1, 2013 until January 1, 2015 any water system not meeting the MCL of 0.001 mg/L on January 1, 2013, shall continue to be monitored for enforcement purposes at the federal MCL of 0.005 mg/L until January 1, 2015. On January 1, 2015 the state MCL of 0.001 mg/L goes into full effect.~~

~~6.2.2 Sampling, Analytical Requirements and Compliance Determination For Contaminants Listed in subsections 6.2.1.1 and 6.2.1.3:~~

~~6.2.2.1 Monitoring of the contaminants listed in subsections 6.2.1.1 and 6.2.1.3 for the purposes of determining compliance with the MCLs shall be conducted as follows:~~

~~6.2.2.2.1 Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.~~

~~6.2.2.2.2 Surface water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. (NOTE: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources).~~

~~6.2.2.2.3 If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating condition (i.e., when water representative of all sources is being used).~~

~~6.2.2.2.4 Monitoring frequency:~~

~~6.2.2.2.4.1 Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in subsections 6.2.1.1 and 6.2.1.3 during each compliance period beginning with the compliance period starting January 1, 1993.~~

~~6.2.2.2.4.2 Systems serving more than 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of two quarterly samples in one year during each repeat compliance period.~~

~~6.2.2.2.4.3 Systems serving less than or equal to 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of one sample during each repeat compliance period.~~

~~6.2.2.2.5 Each community and non-transient water system which does not detect a contaminant listed in subsections 6.2.1.1 and 6.2.1.3 may apply to the Division for a waiver from the requirement of~~

subsection 6.2.2.4.1 upon completion of the initial monitoring. A system must reapply for a waiver at the end of each compliance period.

6.2.2.2.6 The Division may grant a waiver after evaluating the following factors: Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the Division reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted. If previous use of the contaminant is unknown, or it has been used previously, then the following factors shall be used to determine whether a waiver is granted:

6.2.2.2.6.1 Previous analytical results.

6.2.2.2.6.2 The proximity of the system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near water treatment facilities or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities. Non-point sources include the use of pesticides to control insect and weed pests on agricultural areas, forest lands, home and gardens, and other land application uses.

6.2.2.2.6.3 The environmental persistence and transport of the pesticide or PCBs.

6.2.2.2.6.4 How well the water source is protected against contamination due to such factors as depth of the well, the type of soil and the integrity of the well casing.

6.2.2.2.6.5 Elevated nitrate levels at the water supply source.

6.2.2.2.6.6 Use of PCBs in equipment used in the production, storage or distribution of water (i.e., PCBs used in pumps, transformers, etc).

6.2.2.2.7 If an organic contaminant listed in subsections 6.2.1.1 and 6.2.1.3 is detected in any sample then:

6.2.2.2.7.1 Each system must monitor quarterly at each sampling point which resulted in a detection.

6.2.2.2.7.2 The Division may decrease the quarterly monitoring requirement specified in section 6.2.2.7.1 provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Division make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system take a minimum of four quarterly samples.

6.2.2.2.7.3 After the Division determines the system is reliably and consistently below the maximum contaminant level the Division may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter that previously yielded the highest analytical result.

6.2.2.2.7.4 Systems which have 3 consecutive annual samples with no detection of a contaminant may apply to the Division for a waiver as specified in subsection 6.2.2.2.6.

6.2.2.2.7.5 If monitoring results in detection of one or more of certain related contaminants (heptachlor or heptachlor epoxide), then subsequent monitoring shall analyze for all related contaminants.

6.2.2.2.8 Systems which violate the MCL listed in subsections 6.2.1.1 and 6.2.1.3 must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the Division determines the system to be reliably and consistently below the MCL as specified in section 6.2.2.11, the system shall monitor at the frequency specified in subsection 6.2.2.7.3.

6.2.2.2.9 The Division may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Division, the result must be averaged with the first sampling result and the average used for the compliance determination as specified in subsection 6.2.2.11. The Division has the discretion to delete results of obvious sampling errors from this calculation.

6.2.2.2.10 The Division may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed. Detection Limit must be less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collections.

6.2.2.10.1 If the concentration in the composite sample detects one or more contaminants listed in subsections 6.2.1.1 and 6.2.1.3, then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.

6.2.2.10.2 If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these duplicates instead of resampling. The duplicate must be analyzed and the results reported to the Division within 14 days of collection.

6.2.2.10.3 If the population served by the system is >3,300 persons, then compositing may only be permitted by the Division at sampling points within a single system. In systems serving <3,300 persons, the Division may permit compositing among different systems provided the 5-sample limit is maintained.

6.2.2.2.11 Compliance with subsections 6.2.1.1 and 6.2.1.3 shall be determined based on the analytical results obtained at each sampling point. If one sampling [point is in violation of the MCL, the system is in violation of the MCL.

6.2.2.11.1 For systems which are conducting monitoring at a frequency greater than annually, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any samples below the detection limit shall be calculated as zero for purposes of determining the annual average.

6.2.2.11.2 If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Division, the determination of compliance will be based on the average of the two samples.

6.2.2.11.3 If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.

6.2.2.11.4 If a system fails to collect the required number of samples, compliance will be based on the total number of samples collected.

6.2.2.11.5 If a sample result is less than the detection limit, zero will be used to calculate the annual average.

6.2.2.11.6 If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Division may allow the system to give public notice to only that portion of the system which is out of compliance.

6.2.2.2.12 Analysis for the contaminants listed in subsections 6.2.1.1 and 6.2.1.3 shall be conducted in accordance with 40 CFR 141.24(e). Copies may be obtained from the Office of Drinking Water.

6.2.2.2.13 Analysis for PCBs shall be conducted as follows:

6.2.2.2.13.1 Each system which monitors for PCBs shall analyze each sample in accordance with 40 CFR 141.24(h)(13)(i) (see subsection 6.2.2.13.2). Copies may be obtained from the Office of Drinking Water.

6.2.2.2.13.2 If PCBs (as one of seven Aroclors) are detected (as designated in this paragraph) in any sample analyzed using in subsection 6.2.2.13.1, the system shall reanalyze the sample in accordance with 40 CFR 141.24(h)(13)(ii) to quantitate PCBs (as decachlorobiphenyl). Copies may be obtained from the Office of Drinking Water.

6.2.2.2.13.3 Compliance with the PCB MCL shall be determined based upon the quantitative results of analyses conducted in accordance with 40 CFR 141.24(h)(13)(iii). Copies may be obtained from the Office of Drinking Water.

6.2.2.2.14 If monitoring data collected after January 1, 1990, are generally consistent with the requirements of subsection 6.2.2, then the Division may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

6.2.2.2.15 The Division may increase the required monitoring frequency, where necessary, to detect variations within the system (e.g., fluctuations in concentration due to seasonal use, changes in water source).

6.2.2.2.16 The Division has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

6.2.2.2.17 Each public water system shall monitor at the time designated by the Division within each compliance period.

6.2.2.2.18 Detection as used in this paragraph shall be defined as found in 40 CFR 141.24(h)(18). Copies may be obtained from the Office of Drinking Water.

6.2.2.2.19 Analysis under this section shall only be conducted by laboratories that have received certification by EPA or the Division and have met the following conditions:

6.2.2.2.19.1 To receive certification to conduct analyses for the contaminants in subsections 6.2.1.1 and 6.2.1.3 the laboratory must:

6.2.2.2.19.1.1 Analyze Performance Evaluation samples annually in accordance with section 2.14.

6.2.2.2.19.1.2 The laboratory shall achieve quantitative results on the analyses that are within the acceptance limits: specified in 40 CFR 141.24(h)(19)(i)(B). Copies may be obtained from the Office of Drinking Water.

6.2.2.2.20 All new systems or systems that use 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 Division. The system must also comply with the initial sampling frequencies specified by the Division to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted with the requirements in this section.

6.2.2.3 Sampling, Analytical Requirements and Compliance Determination for Contaminants Listed in 6.2.1.2:

6.2.2.3.1 Monitoring of contaminants listed in 6.2.1.2 for the purpose of determining compliance with the MCLs listed in subsection 6.2.1.2 shall be conducted as follows:

6.2.2.3.1 Community water systems which serve a population of 10,000 or more individuals and which add a disinfectant (oxidant) to the water in any part of the drinking water treatment process shall analyze for total trihalomethanes in accordance with this section. For the purpose of this section, the minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with the Division's approval, be considered one treatment plant for determining the minimum number of samples. All samples taken within an established frequency shall be collected within a twenty-four (24) hour period.

6.2.2.3.2 For all community water systems utilizing surface water sources in whole or part, and for all community water systems utilizing only ground water sources that have not been determined by the Division to qualify for the monitoring requirements of subsections 6.2.2.3.3 and 6.2.2.3.4, analyses for total trihalomethanes shall be performed at quarterly intervals on at least four (4) water samples from each treatment plant used by the systems. At least twenty-five (25) percent of the samples shall be taken at locations within the distribution system reflecting the maximum residence time of the water in the system. The remaining seventy-five (75) percent shall be taken at representative locations in the distribution system taking into account number of persons served, different sources of water and different treatment methods employed. The results of all analyses per quarter shall be arithmetically averaged and reported to the division within ten (10) days of the end of the quarter in which the samples were collected. All samples collected shall be used in the computation of the average, unless the analytical results are invalidated for technical reasons. Sampling and analyses shall be conducted in accordance with the methods listed in subsection 6.2.2.3.6.

6.2.2.3.3 The monitoring frequency required by subsection 6.2.2.3.2 may be reduced by the Division to a minimum of one (1) sample analyzed for contaminants listed in 6.2.1.2 per quarter taken at a point in the distribution system reflecting the maximum residence time of the water in the system, upon written determination by the Division that the data from at least one (1) year of monitoring in accordance with subsection 6.2.2.3.2 and local conditions demonstrate that total trihalomethane concentrations will be consistently below the PMCL.

6.2.2.3.4 If at any time during which the reduced monitoring frequency prescribed under this paragraph applies, the results from any analysis exceed 0.10 mg/L of TTHMs and such results are confirmed by at least one (1) check sample taken promptly after such results are received, or if the system makes any significant change to its source of water or treatment program, the system shall immediately begin monitoring in accordance with the requirements of subsection 6.2.2.3.2, which monitoring shall continue for at least one (1) year before the frequency may be reduced again. At the option of the Division, a system's monitoring frequency may and should be increased above the minimum in those cases where it is necessary to detect variations of TTHM levels within the distribution system.

6.2.2.3.5 The monitoring frequency required by subsection 6.2.2.3.2 may be reduced by the Division for ground water supplies to a minimum of one (1) sample for maximum TTHM potential per year for each treatment plant used by the system taken at a point in the distribution system reflecting maximum residence time of the water in the system. The system shall submit to the Division the results of at least one (1) sample analyzed for maximum TTHM

potential for each treatment plant used by the system taken at a point in the distribution system. The system's monitoring frequency may only be reduced by the Division when, based upon the data, the system has a maximum TTHM potential of less than 0.10 mg/L and when, based upon an assessment of local conditions of the system, the system is not likely to approach or exceed the PMCL for TTHMs. The results of all analyses shall be reported to the Division within thirty (30) days of the system's receipt of such results. All samples collected shall be used for determining whether the system must comply with the monitoring requirements of subsections 6.2.2.3.2, 6.2.2.3.3 and 6.2.2.3.4, unless the analytical results are invalidated for technical reasons. Sampling and analyses shall be conducted in accordance with the methods listed in subsection 6.2.2.3.8.

6.2.2.3.6 If at any time during which the reduced monitoring frequency prescribed under subsection 6.2.3.5 applies, the results from any analyses taken by the system for maximum TTHM potential are equal to or greater than 0.10 mg/L, and such results are confirmed by at least one (1) check sample taken promptly after such results are received, the system shall immediately begin monitoring in accordance with the requirements of subsections 6.2.2.3.2, 6.2.2.3.3 and 6.2.2.3.4 and such monitoring shall continue for at least one (1) year before the frequency may be reduced again. In the event of any significant change to the system's raw water or treatment program, the system shall immediately analyze an additional sample for maximum TTHM potential taken at a point in the distribution system reflecting maximum residence time of the water in the system for the purpose of determining whether the system must comply with the monitoring requirements of subsections 6.2.2.3.2, 6.2.2.3.3 and 6.2.2.3.4. At the option of the Division, monitoring frequencies may and should be increased above the minimum in those cases where this necessary to detect variations of TTHM levels within the distribution system.

6.2.2.3.7 Compliance with subsection 6.2.1.2 shall be determined based on running annual average of quarterly samples collected by the system as prescribed in subsections 6.2.2.3.2 or 6.2.2.3.3. If the average of samples covering any twelve (12) month period exceeds the PMCL, the supplier of water shall report to the Division pursuant to section 4.1 and notify the public pursuant to section 4.2. Monitoring after public notification shall be at a frequency designated by the Division and shall continue until a monitoring schedule as a condition to an enforcement action shall become effective.

6.2.2.3.8 Sampling and analyses pursuant to this section shall be conducted in accordance with 40 CFR 141.24(e). Copies may be obtained from the Office of Drinking Water.

6.2.2.3.9 Before a community water system makes any significant modifications to its existing treatment process for the purposes of achieving compliance with section 6.2.1.2, such system must submit and obtain Division approval of a detailed plan setting forth its proposed modification and those safeguards that it will implement to ensure that the bacteriological quality of the drinking water served by such system will not be adversely affected by such modification. Each system shall comply with the provisions set forth in the Division approved plan. At a minimum, a Division approved plan shall require the system modifying its disinfection practice to:

6.2.2.3.9.1 Evaluate the water system for sanitary defects and evaluate the source water for biological quality.

6.2.2.3.9.2 Evaluate its existing treatment practice and consider improvements that will minimize disinfectant demand and optimize finished water quality throughout the distribution system.

6.2.2.3.9.3 Provide baseline water quality survey data of the distribution system. Such data should include the results from monitoring for coliform and fecal coliform bacteria, fecal streptococci, standard plate counts at 35ºC and 20ºC, phosphate, ammonia, nitrogen and total organic carbon. Virus studies should be required where source waters are heavily contaminated with sewage effluent.

6.2.2.3.9.4 Conduct additional monitoring to assure continued maintenance of optimal biological quality in finished water, for example, when chloramines are introduced as disinfectants or when pre-chlorination is being discontinued. Additional monitoring should also be required by the Division for chlorate, chlorite and chlorine dioxide when chlorine dioxide is used as a disinfectant. Standard plate count analyses should also be required by the division as appropriate before and after any modifications.

6.2.2.3.9.5 Demonstrate an active disinfectant residual of >0.04 mg/L throughout the distribution system at all times during and after the modification.

6.2.2.3.10 The requirements in subsections 6.2.2.3.1 through 6.2.2.3.7 apply to subpart H community water systems which serve a population of 10,000 or more until December 16, 2001. The requirements in subsections 6.2.2.3.1 through 6.2.2.3.7 apply to community water systems which use only ground water not under the direct influence of surface water that add a disinfectant (oxidant) in any part of the treatment process and serve a population of 10,000 or more until December 16, 2003. After December 16, 2003, this section is no longer applicable.

6.2.2.3.11 Compliance dates for DBPs.

6.2.2.3.11.1 CWSs and NTNCWS. Subpart H systems serving 10,000 or more persons must comply with this section beginning December 16, 2001. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this section beginning December 16, 2003.

6.2.2.3.11.2 A system that is installing GAC or membrane technology to comply with this section may apply to the State for an extension of up to 24 months past the dates in subsection 6.2.2.3.11.1, but not beyond December 16, 2003. In granting the extension, States must set a schedule for compliance and may specify any interim measures that the system must take. Failure to meet the schedule or interim treatment requirements constitutes a violation of a National Primary Drinking Water Regulation.

6.2.2.4 Sampling, Analytical Requirements and Compliance Determination for VOCs: Monitoring of the contaminants listed in subsection 6.2.1.3 for the purpose of determining compliance with the MCLs shall be conducted as follows:

6.2.2.4.1 Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). If conditions warrant, the Division may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determine consumer exposure. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

6.2.2.4.2 Surface water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). If conditions warrant, the Division may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determines consumer exposure. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plan, or within the distribution system. NOTE: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground surfaces.

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

6.2.2.4.4 Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in subsection 6.2.1.3, during each compliance period beginning in the initial compliance period.

6.2.2.4.5 Groundwater and surface water systems which do not detect one of the contaminants listed in subsection 6.2.1.3 after conducting the initial round of monitoring required in 6.2.2.4.4 of this section may take one sample annually.

6.2.2.4.6 For groundwater and surface water systems, if the initial monitoring for contaminants listed in subsection 6.2.1.3 as allowed in subsection 6.2.2.4.18 has been completed by December 31, 1992 and the system did not detect any contaminant listed in subsection 6.2.1.3 then the system shall take one sample annually. After a minimum of three years of annual sampling, the Division may allow groundwater systems which have no previous detection of any contaminant listed in subsection 6.2.1.3 to take one sample during each compliance period.

6.2.2.4.7 Each community and non-transient non-community groundwater system which does not detect a contaminant listed in subsection 6.2.1.3 may apply to the Division for a waiver from the requirement of subsections 6.2.2.4.5 and 6.2.2.4.6 after completing the initial monitoring. (For the purposes of this section, detection is defined as >0.0005 mg/L). A waiver shall be effective for no more than six years (two compliance periods).

6.2.2.4.7.1 The Division may also issue waivers to small systems (those serving <3,300 persons) for the initial round of monitoring for 1,2,4-trichlorobenzene.

6.2.2.4.8 The Division may grant a waiver after evaluating the following factor(s):

6.2.2.4.8.1 Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the Division reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted.

6.2.2.4.8.2 If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

6.2.2.4.8.2.1 Previous analytical results.

6.2.2.4.8.2.2 The proximity of the system to potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.

6.2.2.4.8.2.3 The environmental persistence and transport of the contaminants.

6.2.2.4.8.2.4 The number of persons served by the public water system and the proximity of a smaller system to a larger system.

6.2.2.4.8.2.5 How well the water source is protected against contamination such as whether it is a surface or groundwater system. Groundwater systems must consider factors such as depth of the well, the type of soil, and well head protection. Surface water systems must consider watershed protection.

6.2.2.4.9 As a condition of the waiver a system must take one sample at each sampling point during the time the waiver is effective (i.e., one sample during two compliance periods or six years) and update its vulnerability assessment considering the factors listed in subsection 6.2.2.4.8. Based on this vulnerability assessment the Division must confirm that the system is non-vulnerable. If the Division does not make this reconfirmation within three years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in subsection 6.2.2.4.5.

6.2.2.4.10 Each community and not-transient non-community surface water system which does not detect a contaminant listed is subsection 6.2.1.3 may apply to the Division for a waiver from the requirements of subsection 6.2.2.4.6 after completing the initial monitoring. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Systems meeting this criterion must be determined by the Division to be non-vulnerable based on a vulnerability assessment during each compliance period. Each system receiving a waiver shall sample at the frequency specified by the Division (if any).

6.2.2.4.11 If a contaminant listed in subsection 6.2.1.3, excluding vinyl chloride, is detected at a level exceeding 0.0005 mg/L in any sample then:

6.2.2.4.11.1 The system must monitor quarterly at each sampling point which resulted in a detection.

6.2.2.4.11.2 The Division may decrease the quarterly monitoring requirement specified in subsection 6.2.2.4.11.1 provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Division make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

6.2.2.4.11.3 If the Division determines that the system is reliably and consistently below the MCL, the Division may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result.

6.2.2.4.11.4 Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Division for a waiver as specified in subsection 6.2.2.4.7.

6.2.2.4.11.5 Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, trans-1,2-dichloroethylene, 1,1,1-trichloroethane, cis-1,2-dichloroethylene or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the Division may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance

period. Surface water systems are required to monitor for vinyl chloride as specified by the Division.

6.2.2.4.12 Systems which violate the requirements of subsection 6.2.1.3 as determined by subsection 6.2.4.15 must monitor quarterly. After a minimum of four consecutive quarterly samples shows the system is in compliance as specified in subsection 6.2.2.4.15, and the Division determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and time specified in subsection 6.2.2.4.11.3.

6.2.2.4.13 The Division may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Division, the result must be averaged with the first sampling result and the average is used for the compliance determination as specified by subsection 6.2.2.4.15. The Division has the discretion to delete results of obvious sampling errors from this calculation.

6.2.2.4.14 The Division may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, providing that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.

6.2.2.4.14.1 If the concentration in the composite sample is >0.0005 mg/L for any contaminant listed in subsection 6.2.1.3, then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.

6.2.2.4.14.2 If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicate must be analyzed and the results reported to the Division within 14 days of collection.

6.2.2.4.14.3 If the population served by the system is >3,300 persons, then compositing may only be permitted by the Division at sampling points within a single system. In systems serving <3,300 persons, the Division may permit compositing among different systems provided the 5-sample limit is maintained.

6.2.2.4.14.4 Compositing samples prior to GC analysis:

6.2.2.4.14.4.1 Add 5 ml or equal larger amounts of each sample (up to 5 samples are allowed) to a 25 ml glass syringe. Special precautions must be made to maintain zero headspace in the syringe.

6.2.2.4.14.4.2 The samples must be cooled at 4^{o} C during this step to minimize volatilization losses.

6.2.2.4.14.4.3 Mix well and draw out a 5-ml aliquot for analysis.

6.2.2.4.14.4.4 Follow sample introduction, purging and desorption steps described in the method.

6.2.2.4.14.4.5 If less than five samples are used for compositing, a proportionately small syringe may be used.

6.2.2.4.14.5 Compositing samples prior to GC/MS analysis:

6.2.4.14.5.1 Inject 5-ml or equal larger amounts of each aqueous sample (up to 5 samples are allowed) into a 25-ml purging device using the sample introduction technique described in the method.

6.2.4.14.5.2 The total volume of the sample in the purging device must be 25 ml.

6.2.4.14.5.3 Purge and desorb as described in the method.

6.2.2.4.15 Compliance with subsection 6.2.1.3 shall be determined based on the analytical results obtained at each sampling point:

6.2.4.15.1 For systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any samples below the detection limit shall be calculated as zero for purposes of determining the annual average.

6.2.4.15.2 If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation

sample is required by the Division, the determination of compliance will be based on the average of the two samples.

6.2.4.15.3 If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Division may allow the system to give public notice to only that area served by that portion of the system which is out of compliance.

6.2.2.4.16 Analysis for the contaminants listed in subsection 6.2.1.3 shall be conducted in accordance with 40 CFR 141.24(e). Copies may be obtained from the Office of Drinking Water.

6.2.2.4.17 Analysis under this section shall only be conducted by laboratories that have received approval by EPA or the Division according to the following conditions:

6.2.2.4.17.1 To receive conditional approval to conduct analyses for the contaminants in subsection 6.2.1.3, excluding vinyl chloride, the laboratory must:

6.2.2.4.17.1.1 Analyze Performance Evaluation samples annually.

6.2.2.4.17.1.2 Achieve the quantitative acceptance limits for at least 80 percent of the regulated organic chemicals listed in subsection 6.2.1.3.

6.2.2.4.17.1.3 Achieve quantitative results on the analyses performed under subsection 6.2.2.4.16 that are within +20 percent of the actual amount of the substances in the Performance Evaluation sample when the actual amount is greater than or equal to 0.010 mg/L.

6.2.2.4.17.1.4 Achieve quantitative results on the analyses performed under subsection 6.2.2.4.16 that are within +40 percent of the actual amount of the substance in the Performance Evaluation sample when the actual amount is less than 0.010 mg/L.

6.2.2.4.17.1.5 Achieve a method detection limit of 0.0005 mg/L according to the procedures listed in Appendix B of 40 CFR Part 136. Copies may be obtained from the Office of Drinking Water.

6.2.2.4.17.1.5.1 {Reserved}.

6.2.2.4.17.2 To receive certification for vinyl chloride, the laboratory must:

6.2.2.4.17.2.1 Analyze Performance Evaluation samples annually.

6.2.2.4.17.2.2 Achieve quantitative results on the analyses performed under subsection 6.2.4.17.2.1 that are within +40 percent of the actual amount of vinyl chloride in the Performance Evaluation sample.

6.2.2.4.17.2.3 Achieve a method detection limit of 0.0005 mg/l, according to the procedures listed in Appendix B of 40 CFR Part 136. Copies may be obtained from the Office of Drinking Water.

6.2.2.4.17.2.4 Obtain certification for the contaminants listed in subsection 6.2.2.1.3.

6.2.2.4.18 The Division may allow the use of monitoring data collected after January 1, 1988 for purposes of initial monitoring compliance. If the data are generally consistent with the other requirements in this section, the Division may use those data (i.e., a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of subsection 6.2.4.4.

6.2.2.4.18.1 Systems which use grandfathered samples and did not detect any contaminant listed in subsection 6.2.2.1.3, excluding vinyl chloride, shall begin monitoring annually in accordance with subsection 6.2.2.4.6 beginning with the initial compliance period.

6.2.2.4.19 The Division may increase required monitoring where necessary to detect variations within the system.

6.2.2.4.20 Each approved laboratory must determine the method detection limit (MDL), as defined in Appendix B of 40 CFR Part 136, copies may be obtained from the Office of Drinking Water, at which it is capable of detecting VOCs. The acceptable MDL is 0.0005 mg/L. This concentration is the detection concentration for purposes of this section.

6.2.2.4.21 Each public water system shall monitor at the time designated by the Division within each compliance period.

6.2.3 Best Available Technologies (BAT)

6.2.3.1 The Division hereby identifies as indicated in the table below either granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX) through chlorination or ozonation as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in subsections 6.2.1.1 and 6.2.1.3.

BAT for Organic Contaminants Listed in subsections 6.2.1.1 and 6.2.1.3

Chemical	gac	pta	ox
Alachlor		X	
Atrazine		X	
Benzene		X	X
Benzo(a)pyrene	X		
Carbofuran		X	
Carbon tetrachloride		X	X
Chlordane		X	
2,4-D	X		
Dalapon	X		
Dibromochloropropane (DBCP)		X	X
o-Dichlorobenzene	X	X	
1,2-Dichloroethane	X	X	
cis-1,2-Dichloroethylene	X	X	
trans-1,2-Dichloroethylene	X	X	
1,1-Dichloroethylene	X	X	
Dichloromethane		X	
1,2-Dichloropropane	X	X	
Di(2-ethylhexyl)adipate	X	X	
Di(2-ethylhexyl)phthalate	X		
Dinoseb	X		
Diquat	X		
Endothall	X		
Endrin	X		
Ethylene Dibromide (EDB)		X	X
Ethylbenzene		X	X
Glyphosate			X
Heptachlor		X	
Heptachlor epoxide		X	
Hexachlorobenzene	X		
Hexachlorocyclopentadiene	X	X	
Lindane		X	
Methoxychlor		X	
Monochlorobenzene		X	X
Oxamyl (Vydate)	X		
para-Dichlorobenzene	X		
Polychlorinated biphenyls (PCB)		X	
Pentachlorophenol		X	
Picloram		X	

Simazine	X		
Styrene	X		
2,4,5-TP (Silvex)		X	X
Tetrachloroethylene		X	X
1,2,4-Trichlorobenzene	X	X	
1,1,1-Trichloroethane	X	X	
1,1,2-Trichloroethane	X	X	
Trichloroethylene		X	X
Toluene		X	
Toxaphene		X	X
2,3,7,8-TCDD (Dioxin)	X		
Vinyl chloride		X	
Xylene		X	X

BAT for Organic Contaminants Listed in subsection 6.2.1.2

TTHM	Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant
HAA5	Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant
Bromate	Control of ozone treatment process to reduce production of bromate
Chlorite	Control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels

6.3.1.1 The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for TTHM and HAA5 identified in subsection 6.2.1.2 for consecutive systems and applies only to the disinfected water that consecutive systems buy or otherwise receive:

Disinfection Byproduct	**Best Available Technology**
Total trihalomethanes (TTHM) and Haloacetic acids (five) (HAA5)	Systems serving ≥10,000: Improved distribution system and storage tank management to reduce residence time, plus the use of chloramines for disinfectant residual maintenance Systems serving <10,000: Improved distribution system and storage tank management to reduce residence time

6.3.2 BAT for Inorganic Contaminants Listed in subsection 6.1.1.1

Chemical Name	**BAT(s)**
Antimony	2,7
Arsenic[4]	1,2,5,6,7,9,12[5]
Asbestos	2,3,8
Barium	5,6,7,9

Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6[2],7
Cyanide	5,7,10
Mercury	2[1],4,6[1],7[1]
Nickel	5,6,7
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2[3],6,7,9
Thallium	1,5

[1] BAT only if influent Hg concentrations <10 ug/l

[2] BAT for Chromium III only.

[3] BAT for Selenium IV only.

[4] BAT for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.

[5] To obtain high removals, iron to arsenic ratio must be at least 20:1.

Key to BATs in Table

1 = Activated Alumina
2 = Coagulation/Filtration Not BAT for systems <500 service connections.
3 = Direct and Diatomite Filtration
4 = Granular Activated Carbon
5 = Ion Exchange
6 = Lime Softening Not BAT for systems <500 service connections.
7 = Reverse Osmosis
8 = Corrosion Control
9 = Electrodialysis
10 = Chlorine
11 = Ultraviolet
12 = Oxidation/Filtration

6.3.3 Treatment techniques for acrylamide and epichlorohydrin.

6.3.3.1 Each public water system must certify annually in writing to the Division (using a third party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified as follows:

- Acrylamide = 0.05% dosed at 1 PPM (or equivalent).
- Epichlorohydrin = 0.01% dosed at 20 PPM (or equivalent).

6.3.4 The Administrator, U.S. Environmental Protection Agency, pursuant to section 1412 of the Safe Drinking Water Act, hereby identifies in the following table the affordable technology, treatment technique, or other means available to systems serving 10,000 persons or fewer for achieving compliance with the MCL for arsenic:

SMALL SYSTEM COMPLIANCE TECHNOLOGIES (SSCTs)[1] FOR ARSENIC[2]

Small system compliance technology	**Affordable for listed small systems categories[3]**

Activated Alumina (centralized)	All size categories
Activated Alumina (Point-of-Use)[4]	All size categories
Coagulation/Filtration[5]	501-3,300, 3,300-10,000
Coagulation-assisted Microfiltration	501-3,300, 3,300-10,000
Electrodialysis reversal[6]	501-3,300, 3,300-10,000
Enhanced Coagulation/Filtration	All size categories
Enhanced Lime Softening (pH>10.5)	All size categories
Ion Exchange	All size categories
Lime Softening[5]	501-3,300, 3,300-10,000
Oxidation/Filtration[7]	All size categories
Reverse Osmosis (centralized)[6]	501-3,300, 3,300-10,000
Reverse Osmosis (Point-of-Use)[4]	All size categories

[1] section 1412(b)(4)(E)(ii) of the Safe Drinking Water Act specifies that SSCTs must be affordable and technically feasible for small systems.

[2] SSCTs for Arsenic V. Preoxidation may be required to convert Arsenic III to Arsenic V.

[3] The Safe Drinking Water Act specifies three categories of small systems: (i) those serving 25 or more, but fewer than 501, (ii) those serving more than 500, but fewer than 3,301, and (iii) those serving more than 3,300, but fewer than 10,001.

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

[5] Unlikely to be installed solely for arsenic removal. May require pH adjustment to optimal range if high removals are needed.

[6] Technologies reject a large volume of water – may not be appropriate for areas where water quantity may be an issue.

[7] To obtain high removals, iron to arsenic ratio must be at least 20:1.

6.4 Maximum Contaminant Level (MCL) Effective Dates:

Fluoride - October 2, 1987

Phase I (VOCs) - January 9, 1989

Phase II - July 30, 1992

Phase IIB - January 1, 1993

Phase V - January 17, 1994

17 DE Reg. 439 (10/01/13)

7.0 Turbidity and Corrosivity

7.1 Turbidity MCL, Sampling and Analytical Methodology: (Effective no later than June 29, 1993)

7.1.1 Turbidity MCL: The PMCLs for turbidity are applicable to both CWSs and NCWSs utilizing surface water sources in whole or in part. The PMCLs for turbidity in drinking water, measured at a representative entry point(s) to the distribution system are:

7.1.1.1 One (1) NTU, as determined by a monthly average pursuant to subsection 7.1.2, except that five (5) or fewer NTUs may be allowed if the supplier of water can demonstrate to the Division that the higher turbidity does not do any of the following:

7.1.1.1.1 Interfere with disinfection;

7.1.1.1.2 Prevent maintenance of an effective disinfectant agent throughout the distribution system or;

7.1.1.1.3 Interfere with microbiological determinations.

7.1.1.2 Five (5) NTUs based on an average for two (2) consecutive days pursuant to subsection 7.1.2.

7.1.2 Turbidity Sampling and Analytical Methodology:

7.1.2.1 Samples shall be taken by suppliers of water for both CWSs and NCWSs using surface water in whole or in part at a representative entry point(s) to the water distribution system at least once per day, for the purpose of making turbidity measurements to determine compliance with subsection 7.1.1. The turbidity measurements shall be made in accordance with 40 CFR 141.74(a)(1). Copies may be obtained from the Office of Drinking Water.

7.1.2.2 If the result of a turbidity analysis indicates that the MCL has been exceeded, the sampling and measurement shall be confirmed by resampling as soon as practicable and preferably within one (1) hour. If the repeat sample confirms that the MCL has been exceeded, the supplier of water shall report to the Division within forty-eight (48) hours. The repeat sample shall be the sample used for the purpose of calculating the monthly average. If the monthly average of the daily samples exceeds the MCL, or if the average of two (2) samples taken on consecutive days exceeds five (5) NTU, the supplier of water shall report to the Division and notify the public as directed in subsections 4.1 and 4.2.

7.1.2.3 When required by the Division, samples shall be taken by suppliers of water for both CWSs and NCWSs utilizing ground water only, at representative points in the distribution system.

7.2 Corrosivity Sampling, Reporting and Analytical Methodology: Suppliers of water for community public water systems shall collect samples from a representative entry point to the water distribution system for the purpose of analyses to determine the corrosivity characteristics of the water.

7.2.1 Sampling Requirements: For water suppliers utilizing surface water wholly or in part, two (2) samples per plant are required, one (1) during mid-winter and one (1) during mid-summer. For water suppliers utilizing wholly ground water sources, one (1) sample per plant per year shall be required.

7.2.1.1 The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may be considered one (1) treatment plant for determining the minimum number of samples.

7.2.1.2 Determination of the corrosivity characteristics of the water shall include measurement of pH, calcium hardness, alkalinity, temperature, total dissolved solids (total filterable residue) and the calculation of the Langelier Index (LI) in accordance with subsection 7.2.3.1. The determination of corrosivity characteristics shall only include one (1) round of sampling (two (2) samples per plant for surface water and one sample per plant for ground water sources). However, the Division may require addition or more frequent monitoring as appropriate. In addition, the Division has the discretion to require monitoring for additional parameters which may indicate corrosivity characteristics such as sulfates and chlorides. In certain cases, the Aggressive Index (AI) as described in subsection 7.2.3.2 can be used instead of the LI. The Division will make this determination. Waters exhibiting a LI of less than -2.0 or an AI of less than 10.0 shall be considered highly corrosive/aggressive.

7.2.2 Reporting to the Division: The supplier of water shall report to the Division the results of the analyses for corrosivity characteristics pursuant to subsection 4.1.1.

7.2.3 Analytical Methodology: Analyses conducted to determine the corrosivity of the water shall be made in accordance with the following methods:

7.2.3.1 Langelier Index -- "Standard Methods for the Examination of Water and Wastewater," 19th Edition, Method 203.

7.2.3.2 Aggressive Index -- "AWWA Standard for Asbestos-Cement Pipe, 4 in. through 24 in. for Water Other Liquids," AWWA C400-77, Revision of C400-75, AWWA, Denver, Colorado.

7.2.3.3 Total Filterable Residue -- "Standard Methods for the Examination of Water and Wastewater," 19th Edition, Method 208B, or "Methods of Chemical Analysis of Water and Wastes," Method 160.1.

7.2.3.4 Temperature, Calcium, Alkalinity, and pH -- in accordance with 40 CFR 141.23(k)(1). Copies may be obtained from the Office of Drinking Water.

7.2.3.5 Chloride and Sulfate – in accordance with 40 CFR 143.4. Copies may be obtained from the Office of Drinking Water.

7.2.3.6 Any alternate analytical technique approved by the Division.

7.2.4 Reporting of Construction Materials: PWSs shall identify whether the following construction materials are present in their distribution system and report to the Division:

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

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

7.2.4.3 Galvanized piping, service lines and home plumbing.

7.2.4.4 Ferrous piping materials such as cast iron and steel.

7.2.4.5 Asbestos cement pipe.

7.2.4.6 Vinyl lined asbestos cement pipe.

7.2.4.7 Coal tar lined pipes and tanks.

7.2.4.8 In addition, the Division may require identification and reporting of other materials of construction present in distribution systems that may contribute contaminants to the drinking water.

8.0 Public Water System Classification and Treatment Requirements

8.1 Regulatory Classification:

8.1.1 All public water systems shall:

8.1.1.1 Meet all bacteriological requirements;

8.1.1.2 Meet the nitrate and nitrite requirements and;

8.1.1.3 Conform with provisions of Section 5.0.

8.1.2 All community and non-transient non-community public water systems as defined in Section 1.0 shall:

8.1.2.1 Meet all the requirements of subsection 8.1.1 and;

8.1.2.2 Meet all other Primary Standards and;

8.1.2.3 Meet all requirements of subsection 6.1.7.

8.1.3 All community public water systems as defined in Section 1.0 and that serve more than 500 service connections within the state shall:

8.1.3.1 Meet all requirements of subsection 8.1.1 and;

8.1.3.2 Meet all requirements of subsection 8.1.2 and;

8.1.3.3 Meet all other primary and secondary standards.

NOTE - All public water systems should meet all secondary MCLs.

8.2 Disinfection: When it is specifically required by these regulations, or when it is deemed to be required to ensure compliance with subsection 3.4 or where it is demonstrated through bacteriological testing that there is a need for disinfection, continuous disinfection shall be provided. The disinfection shall be chlorine, unless a substitute is approved prior to installation. Plans and specifications for the disinfection system shall be approved in accordance with subsection 2.11. When the disinfection is instituted, it shall be operated such that a free chlorine residual of at least 0.3 mg/L is maintained throughout the water distribution system. The supplier of water shall keep accurate records of the amount of chlorine used and shall have an approved test kit for measuring both free and total chlorine residuals. The supplier of water shall be required to conduct chlorine residual testing at least daily, and shall report these results to the Division on a monthly basis in accordance with subsection 4.1.1. If a substitute disinfectant is approved, the operational and monitoring requirements shall be specified by the Division.

8.2.1 Public water systems must measure residual disinfectant concentrations with one of the analytical methods in the following table. Except for the method for ozone residuals, the disinfectant residual methods are contained in the 18th, 19th, and 20th editions of Standard Methods for the Examination of Water and Wastewater, 1992, 1995, and 1998 respectively; the cited methods published in any of these three editions may be used. The ozone method, 45400-O_3 B, is contained in both the 18th and 19th editions of Standard Methods for the Examination of Water and Wastewater, 1992, 1995 respectively; either edition may be used. If approved by the Division, residual concentrations for free chlorine and combined chlorine also may be measured by using DPD colorimetric test kits. Free and total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument provided the chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five days, or with a protocol approved by the Division.

Residual	Methodology	Methods
Free Chlorine	Amperometric Titration	4500-Cl D
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Syringaldazine (FACTS)	4500-Cl H

Total Chlorine	Amperometric Titration	4500-Cl D
	Amperometric Titration (low level measurement)	4500-Cl E
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Iodometric	4500-Cl I
Chlorine Dioxide	Amperometric Titration	4500-ClO_2 C
	DPD Method	4500-ClO_2 D
	Amperometric Titration	4500-ClO_2 E
Ozone	Indigo Method	4500-O_3 B

8.3 Maximum Residual Disinfection Levels (MRDLs):

8.3.1 Maximum residual disinfection levels are as follows:

Disinfectant residual	**MRDL (mg/L)**
Chlorine	4.0 (as Cl_2)
Chloramines	4.0 (as Cl_2)
Chlorine Dioxide	0.8 (as ClO_2)

8.3.2 Compliance dates:

8.3.2.1 CWSs and NTNCWSs. Subpart H systems serving 10,000 or more persons must comply with this section beginning December 16, 2001. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with section 8.4 beginning December 16, 2003.

8.3.2.2 Transient NCWSs. Subpart H systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning December 16, 2001. Subpart H systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning December 16, 2003.

8.3.3 The Administrator, U.S. Environmental Protection Agency, pursuant to section 1412 of the Safe Drinking Water Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum residual disinfectant levels identified in section 8.3.1: control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels.

8.4 Sampling, Analytical Requirements, and Compliance Determinations for Disinfectant Residuals, Disinfection Byproducts, and Disinfection Precursors:

8.4.1 General requirements: The requirements of this section constitute national primary drinking water regulations.

8.4.1.1 The regulations in this section establish criteria under which community water systems (CWSs) and non-transient, non-community water systems (NTNCWSs) which add a chemical disinfectant to the water in any part of the drinking water treatment process must modify their practices to meet MCLs and MRDLs in subsections 6.2.1.2 and 8.3, respectively, and must meet the treatment technique requirements for disinfection byproduct precursors in subsection 8.7.

8.4.1.2 The regulations in this section establish criteria under which transient NCWSs that use chlorine dioxide as a disinfectant or oxidant must modify their practices to meet the MRDL for chlorine dioxide in subsection 8.3.

8.4.1.3 EPA has established MCLs for TTHM and HAA5 and treatment technique requirements for disinfection byproduct precursors to limit the levels of known and unknown disinfection byproducts which may have adverse health effects. These disinfection byproducts may include chloroform;

bromodichloromethane; dibromochloromethane; bromoform; dichloroacetic acid; and trichloroacetic acid.

8.4.2 Compliance Dates

8.4.2.1 CWSs and NTNCWSs. Unless otherwise noted, systems must comply with the requirements of this section as follows. Subpart H systems serving 10,000 or more persons must comply with this section beginning December 16, 2001. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this section beginning December 16, 2003. All systems must comply with these MCLs until the date specified in subsection 8.9.1.3.

8.4.2.2 Transient NCWSs. Subpart H systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide and chlorite in this section beginning December 16, 2001. Subpart H systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide and chlorite in this section beginning December 16, 2003.

8.4.3 Each CWS and NTNCWS regulated under subsection 8.4.1 must be operated by qualified personnel who meet the requirements specified by the State and are included in a State register of qualified operators.

8.4.4 Control of disinfectant residuals. Notwithstanding the MRDLs in subsection 8.3, systems may increase residual disinfectant levels in the distribution system of chlorine or chloramines (but not chlorine dioxide) to a level and for a time necessary to protect public health, to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm run-off events, source water contamination events, or cross-connection events.

8.4.5 For compliance with this section systems must use analytical methods in accordance with 40 CFR 141.131(a); 40 CFR 141.131(b)(1-2); 40 CFR 141.131(c)(1-2); and 40 CFR 141.131(d)(1-6. Copies may be obtained from the Office of Drinking Water.

8.4.5.1 Analysis under this section for disinfection byproducts must be conducted by laboratories that have received certification by EPA or the Division, except as specified under subsection 8.4.7.2.1.3. To receive certification to conduct analysis for the contaminants in subsection 6.2.1.2, the laboratory must carry out annual analyses of performance evaluation (PE) samples approved by EPA or the Division. In the analyses of PE samples, the laboratory must achieve quantitative results within the acceptance limit on all of the analytes included in each PE sample. The acceptance limit is defined as the 95% confidence interval calculated around the mean of the PE study data between a maximum and a minimum acceptance limit of+/-50% and +/-15% of the study mean.

8.4.5.2 A party approved by the EPA or the Division must measure residual disinfectant concentration.

8.4.6 Monitoring requirements – General requirements:

8.4.6.1 Systems must take all samples during normal operating conditions.

8.4.6.2 Systems may consider multiple wells drawing from a single aquifer as one treatment plant for determining the minimum of TTHM and HAA5 samples required, with the approval of the Division in accordance with criteria developed under subsection 6.2.3.1.

8.4.6.3 Failure to monitor in accordance with the monitoring plan required under subsection 8.4.11 is a monitoring violation.

8.4.6.4 Failure to monitor will be treated as a violation for the entire period covered by the annual average where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MCLs or MRDLs.

8.4.6.5 Systems may use only data collected under the provisions of this section or 61 FR 24368, May 14, 1996 to qualify for reduced monitoring.

8.4.7 Monitoring requirements for disinfection byproducts:

8.4.7.1 TTHM and HAA58.4.7.1.1 Routine monitoring. Systems must monitor at the frequency indicated in the following table:

Type of system	**Minimum monitoring frequency**	**Sample location in the distribution system**

Subpart H system serving at least 10,000 persons	Four water samples per quarter per treatment plant	At least 25% of all samples collected each quarter at locations representing maximum residence time. Remaining samples taken at locations representative of at least average residence time in the distribution system and representing the entire distribution system, taking into account number of persons served, different sources of water, and different treatment methods.[1]
Subpart H systems serving from 500 to 9,999 persons	One water sample per quarter per treatment plant	Locations representing maximum residence time.[1]
Subpart H system serving fewer than 500 persons	One sample per year per treatment plant during month of warmest water temperature	Location representing maximum residence time.[1] If the sample (or average of annual samples, if more than one sample is taken) exceeds MCL, system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until system meets reduced monitoring criteria in subsection 8.4.7.1.4.
Systems using only groundwater not under the direct influence of surface water using chemical disinfectant and serving at least 10,000 persons.	One sample per quarter per treatment plant.[2]	Locations representing maximum residence time.[1]
Systems using only groundwater not under the direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons.	One sample per year per treatment plant[2] during the month of warmest water temperature.	Locations representing maximum residence time.[1] If the sample (or average of annual samples, if more than one sample is taken) exceeds MCL, system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until system meets reduced monitoring criteria in subsection 8.4.7.1.2.

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

[2] Multiple wells drawing from a single aquifer may be considered one treatment plant for determining the minimum number of samples required, with Division approval in accordance with criteria developed under subsection 6.2.3.1.

8.4.7.1.2 Reduced monitoring. Systems may reduce monitoring, except as otherwise provided, in accordance with the following table:

If you are a…	**If you have monitored at least one year and your…**	**You may reduce monitoring to this level.**

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

Note: Any Subpart H system serving fewer than 500 persons may not reduce its monitoring to less than one sample per treatment plant per year.

8.4.7.1.3 Monitoring requirements for source water TOC. In order to qualify for reduced monitoring for TTHM and HAA5 under subsection 8.4.7.1.2, subpart H systems not monitoring under the provisions of subsection 8.4.9.1 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 Division. In addition to meeting the other criteria for reduced monitoring in subsection 8.4.7.1.2, 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 subsection 8.4.7.1.2, a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to treatment.

8.4.7.1.4 Systems on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year (for systems which must monitor quarterly) or the result of the sample (for systems which must monitor no more frequently than annually) is no more than 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively. Systems that do not meet these levels must resume monitoring at the frequency identified in subsection 8.4.7.1.1 in the quarter immediately following the quarter in which the system exceeds 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively. For systems using only groundwater not under the direct influence of surface water and serving fewer than 10,000 persons, if either the TTHM annual average is >0.080 mg/L or the HAA5 annual average is >0.060 mg/L, the system must go to increased monitoring identified in subsection 8.4.7.1.1(sample location column) in the quarter immediately following the monitoring period in which the system exceeds 0.080 mg/L or 0.060 mg/L for TTHMs or HAA5s respectively.

8.4.7.1.5 Systems on increased monitoring may return to routine monitoring if, after at least one year of monitoring their TTHM annual average is <0.060 mg/L and their HAA5 annual average is <0.045 mg/L.

8.4.7.1.6 The Division may return a system to routine monitoring at the Division's discretion.

8.4.7.2 Chlorite. Community and non-transient non-community water systems using chlorine dioxide, for disinfection or oxidation, must conduct monitoring for chlorite.

8.4.7.2.1 Routine monitoring

8.4.7.2.1.1 Daily monitoring. Systems must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the system must take additional samples in the distribution system the following day at the locations required by section 8.4.7.2.2, in addition to the sample required at the entrance to the distribution system.

8.4.7.2.1.2 Monthly monitoring. Systems must take a three-sample set each month in the distribution system. The system must take one sample at each of the following locations: near the first customer, at a location representative of average residence time, and at a location reflecting maximum residence time in the distribution system. Any additional routine sampling must be conducted in the same manner (as three-sample sets, at the specified locations). The system may use the results of additional monitoring conducted under subsection 8.4.7.2.2 to meet the requirement for monitoring in this paragraph.

8.4.7.2.1.3 A party approved by EPA or the Division must measure daily chlorite samples at the entrance to the distribution system.

8.4.7.2.2 Additional monitoring. On each day following a routine sample monitoring result that exceeds the chlorite MCL at the entrance to the distribution system, the system is required to take three chlorite distribution system samples at the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

8.4.7.2.3 Reduced monitoring.

8.4.7.2.3.1 Chlorite monitoring at the entrance to the distribution system required by subsection 8.4.7.2.1.1 may not be reduced.

8.4.7.2.3.2 Chlorite monitoring in the distribution system required by subsection 8.4.7.2.1.2 may be reduced to one three-sample set per quarter after one year of monitoring where no individual chlorite sample taken in the distribution system under subsection 8.4.7.2.1.2 has exceeded the chlorite MCL and the system has not been required to conduct monitoring under subsection 8.4.7.2.2. The system may remain on the reduced monitoring schedule until either any of the three individual chlorite samples taken quarterly in the distribution system under subsection 8.4.7.2.1.2 exceeds the chlorite MCL or the system is required to conduct monitoring under subsection 8.4.7.2.2, at which time the system must revert to routine monitoring.

8.4.7.3 Bromate.

8.4.7.3.1 Routine monitoring. Community and non-transient non-community systems using ozone, for disinfection or oxidation, must take one sample per month for each treatment plant in the system using ozone. Systems must take samples monthly at the entrance to the distribution system while the ozonation system is operating under normal conditions.

8.4.7.3.2 Reduced monitoring.

8.4.7.3.2.1 Until March 31, 2009, systems required to analyze for bromate may reduce monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly bromide measurements for one year. The system may remain on reduced bromate monitoring until the running annual average source water bromide concentration, computed quarterly, is equal to or greater than 0.05 mg/L based upon representative monthly measurements. If the running annual average source water bromide concentration is >0.05 mg/L, the system must resume routine monitoring required by subsection 8.4.7.3.1.

8.4.7.3.2.2 Beginning April 1, 2009, systems may no longer use the provisions of subsection 8.4.7.3.2.1 to qualify for reduced monitoring. A system required to analyze for bromate may reduce monitoring from monthly to quarterly, if the system running annual average bromate concentration is <0.0025 mg/L based on monthly bromate measurements under subsection 8.4.7.3.1 for the most recent four quarters, with samples analyzed using Method 317.0 Revision 2.0, 326.0 or 321.8. If a system has qualified for reduced bromate monitoring under subsection 8.4.7.3.2.1 that system may remain on reduced monitoring as long as the running annual average of quarterly bromate samples <0.0025 mg/L based on samples analyzed using Method 317.0 Revision 2.0, 326.0, or 321.8. If the running annual average bromate concentration is >0.0025 mg/L, the system must resume routine monitoring required by subsection 8.4.7.3.1.

8.4.8 Monitoring requirements for disinfectant residuals.

8.4.8.1 Chlorine and Chloramines.

8.4.8.1.1 Routine monitoring. Systems must measure the residual disinfectant level at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in Section 5.0. Subpart H systems may use the results of residual disinfectant concentration sampling conducted under subsection 10.5.3, in lieu of taking separate samples.

8.4.8.1.2 Reduced monitoring. Monitoring may not be reduced.

8.4.8.2 Chlorine dioxide.

8.4.8.2.1 Routine monitoring. Community, non-transient non-community, and transient non-community water systems that use chlorine dioxide for disinfection or oxidation must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the system must take samples in the distribution system the following day at the locations required by subsection 8.4.8.2.2, in addition to the sample required at the entrance to the distribution system.

8.4.8.2.2 Additional monitoring. On each day following a routine sample monitoring result that exceeds the MRDL, the system is required to take three chlorine dioxide distribution system samples. If chlorine dioxide or chloramines are used to maintain a disinfectant residual in the distribution system, or if chlorine is used to maintain a disinfectant residual in the distribution system and there are no disinfection addition points after the entrance to the distribution system (i.e., no booster chlorination), the system must take three samples as close to the first customer as possible, at intervals of at least six hours. If chlorine is used to maintain a disinfectant residual in the distribution system and there are one or more disinfection addition points after the entrance to the distribution system (i.e., booster chlorination), the system must take one sample at each of the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

8.4.8.2.3 Reduced monitoring. Chlorine dioxide monitoring may not be reduced.

8.4.9 Monitoring requirements for disinfection byproduct precursors (DBPP).

8.4.9.1 Routine monitoring. Subpart H systems which use conventional filtration treatment (as defined in Section 1.0) must monitor each treatment plant for TOC no later than the point of combined filter effluent turbidity monitoring and representative of the treated water. All systems required to monitor under this paragraph must also monitor for TOC in the source water prior to any treatment at the same time as monitoring for TOC in the treated water. These samples (source water and treated water) are referred to as paired samples. At the same time as the source water sample is taken, all systems must monitor for alkalinity in the source water prior to any treatment. Systems must take one paired sample and one source water alkalinity sample per month per plant at a time representative of normal operating conditions and influent water quality.

8.4.9.2 Reduced monitoring. Subpart H systems with an average treated water TOC of less than 2.0 mg/L for two consecutive years, or less than 1.0 mg/L for one year, may reduce monitoring for both TOC and alkalinity to one paired sample and one source water alkalinity sample per plant per quarter. The system must revert to routine monitoring in the month following the quarter when the annual average treated water TOC >2.0 mg/L.

8.4.10 Bromide. Until April 1, 2009, systems required to analyze for bromate may reduce bromate monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly measurements for one year. The system must continue bromide monitoring to remain on reduced bromate monitoring.

8.4.11 Monitoring plans. Each system required to monitor under this subsection 8.4 must develop and implement a monitoring plan. The system must maintain the plan and make it available for inspection by the State and the general public no later than 30 days following the applicable compliance dates in subsection 8.4.2. All Subpart H systems serving more than 3300 people must submit a copy of the monitoring plan to the State no later than the date of the first report required under subsection 8.6. The State may also require the plan to be submitted by any other system. After review, the State may require changes in any plan elements. The plan must include at least the following elements.

8.4.11.1 Specific locations and schedules for collecting samples for any parameters included in this section.

8.4.11.2 How the system will calculate compliance with MCLs, MRDLs, and treatment techniques.

8.4.11.3 If approved for monitoring as a consecutive system, or if providing water to a consecutive system, under the provisions of subsection 2.16.1, the sampling plan must reflect the entire distribution system.

8.5 Compliance requirements:

8.5.1 General requirements.

8.5.1.1 Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor for TTHM, HAA5, or bromate, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MRDLs for chlorine and chloramines, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average.

8.5.1.2 All samples taken and analyzed under the provisions of this section must be included in determining compliance, even if that number is greater than the minimum required.

8.5.1.3 If, during the first year of monitoring under subsection 8.4, any individual quarter's average will cause the running annual average of that system to exceed the MCL, the system is out of compliance at the end of that quarter.

8.5.2 Disinfection byproducts.

8.5.2.1 TTHMs and HAA5s

8.5.2.1.1 For systems monitoring quarterly, compliance with MCLs in subsection 6.2.1.2 must be based on a running annual arithmetic average, computed quarterly, of quarterly arithmetic averages of all samples collected by the system as prescribed by subsection 8.4.7.1. If the running annual arithmetic average of quarterly averages covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to subsection 4.2, in addition to reporting to the State pursuant to subsection 8.6. If a PWS fails to complete four consecutive quarters' monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.

8.5.2.1.2 For systems monitoring less frequently than quarterly, compliance must be based on an average of samples taken that year under the provisions of subsection 8.4.7.1. If the average of these samples exceeds the MCL, the system must increase monitoring to once per quarter per treatment plant and such a system is not in violation of the MCL until it has completed one year of quarterly monitoring, unless the result of fewer than four quarters of monitoring will cause the running annual average to exceed the MCL, in which case the system is in violation at the end of that quarter. Systems required to increase monitoring frequency to quarterly monitoring must calculate compliance by including the sample that triggered the increased monitoring plus the following three quarters of monitoring.

8.5.2.2 Bromate. Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly samples (or, for months in which the system takes more than one sample, the average of all samples taken during the month) collected by the system as prescribed by section 8.4.7.3. If the average of samples covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to section 4.2, in addition to reporting to the State pursuant to section 8.6. If a PWS fails to complete 12 consecutive months' monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.

8.5.2.3 Chlorite. Compliance must be based on an arithmetic average of each three sample set taken in the distribution system as prescribed by subsections 8.4.7.2.1.1 and 8.4.7.2.2. If the arithmetic average of any three sample set exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to subsection 4.2, in addition to reporting to the State pursuant to subsection 8.6.

8.5.3 Disinfectant residuals.

8.5.3.1 Chlorine and chloramines.

8.5.3.1.1 Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly averages of all samples collected by the system under subsection 8.4.8.1. If the average of quarterly averages covering any consecutive four-quarter period exceeds the MRDL, the system is in violation of the MRDL and must notify the public pursuant to subsection 4.2, in addition to reporting to the State pursuant to subsection 8.6.

8.5.3.1.2 In cases where systems switch between the use of chlorine and chloramines for residual disinfection during the year, compliance must be determined by including together all monitoring results of both chlorine and chloramines in calculating compliance. Reports submitted pursuant to section 8.6 must clearly indicate which residual disinfectant was analyzed for each sample.

8.5.3.2 Chlorine dioxide

8.5.3.2.1 Acute violations. Compliance must be based on consecutive daily samples collected by the system under subsection 8.4.8.2. If any daily sample taken at the entrance to the distribution system exceeds the MRDL, and on the following day one (or more) of the three samples taken in the distribution system exceed the MRDL, the system is in violation of the MRDL and must take immediate corrective action to lower the level of chlorine dioxide below the MRDL and must notify the public pursuant to the procedures for acute health risks in subsection 4.2 in addition to reporting to the Division pursuant to subsection 8.6. Failure to take samples in the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system will also be considered an MRDL violation and the system must notify the public of the violation in accordance with the provisions for acute violations under subsection 4.2 in addition to reporting to the Division in accordance with subsection 8.6.

8.5.3.2.2 Non-acute violations. Compliance must be based on consecutive daily samples collected by the system under subsection 8.4.8.2. If any two consecutive daily samples taken at the entrance to the distribution system exceed the MRDL and all distribution system samples taken are below the MRDL, the system is in violation of the MRDL and must take corrective action to lower the level of chlorine dioxide below the MRDL at the point of sampling and will notify the public pursuant to the procedures for non-acute health risks in subsection 4.2 in addition to reporting to the Division pursuant to subsection 8.6. Failure to monitor at the entrance to the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also an MRDL violation and the system must notify the public of the violation in accordance with the provisions for non-acute violations under subsection 4.2 in addition to reporting to the Division in accordance with subsection 8.6.

8.5.4 Disinfection byproduct precursors (DBPP). Compliance must be determined as specified by subsection 8.7.3. Systems may begin monitoring to determine whether Step 1 TOC removals can be met 12 months prior to the compliance date for the system. This monitoring is not required and failure to monitor during this period is not a violation. However, any system that does not monitor during this period, and then determines in the first 12 months after the compliance date that it is not able to meet the Step 1 requirements in subsection 8.7.2.2 and must therefore apply for alternate minimum TOC removal (Step 2) requirements, is not eligible for retroactive approval of alternate minimum TOC removal (Step 2) requirements as allowed pursuant to subsection 8.7.2.3 and is in violation. Systems may apply for alternate minimum TOC removal (Step 2) requirements any time after the compliance date. For systems required to meet Step 1 TOC removals, if the value calculated under subsection 8.7.3.1.4 is less than 1.00, the system is in violation of the treatment technique requirements and must notify the public pursuant to subsection 4.2, in addition to reporting to the Division pursuant to subsection 8.6.

8.6 Reporting and recordkeeping requirements:

8.6.1 Systems required to sample quarterly or more frequently must report to the State within 10 days after the end of each quarter in which samples were collected, notwithstanding the provisions of subsections 4.1.1, 4.1.2, 4.1.3, 4.1.7 and 4.1.8. Systems required to sample less frequently than quarterly must report to the State within 10 days after the end of each monitoring period in which samples were collected.

8.6.2 Disinfection byproducts. Systems must report the information specified in the following table:

If you are a…	**You must report[1]…**
System monitoring for TTHM and HAA5 under the requirements of section 8.4.7 on a quarterly or more frequent basis	1. The number of samples taken during the last quarter. 2. The location, date, and result of each sample taken during the last quarter. 3. The arithmetic average of all samples taken in the last quarter. 4. The annual arithmetic average of the quarterly arithmetic averages of this section for the last four quarters. 5. Whether, based on subsection 8.5.2.1, the MCL was violated.

System monitoring for TTHMs and HAA5 under the requirements of section 8.4.7 less frequently than quarterly (but at least annually).	1. The number of samples taken during the last year. 2. The location, date, and result of each sample taken during the last quarter. 3. The arithmetic average of all samples taken over the last year. 4. Whether, based on subsection 8.5.2.1, the MCL was violated.
System monitoring for TTHMs and HAA5 under the requirements of section 8.4.7 less frequently than annually.	1. The location, date, and result of the last sample taken. 2. Whether, based on subsection 8.5.2.1, the MCL was violated.
System monitoring for chlorite under the requirements of section 8.4.7.	1. The number of entry point samples taken each month for the last three months. 2. The location, date, and result of each sample taken during the last quarter. 3. For each month in the reporting period, the arithmetic average of all samples taken in the month. 4. Whether, based on subsection 8.5.2.3, the MCL was violated, and how many times it was violated each month.
System monitoring for bromate under the requirements of section 8.4.7.	1. The number of samples taken during the last quarter. 2. The location, date, and result of each sample taken during the last quarter. 3. The arithmetic average of the monthly arithmetic averages of all samples taken in the last year. 4. Whether, based on subsection 8.5.2.2 the MCL was violated.

[1] The Division may choose to perform calculations and determine whether the MCL was exceeded, in lieu of having the system report that information.

8.6.3 Disinfectants. Systems must report the information specified in the following table:

If you are a…	**You must report1…**
System monitoring for chlorine or chloramines under the requirements of section 8.4.8.	1. The number of samples taken during the month of the last quarter. 2. The monthly arithmetic average of all samples taken in each month for the last 12 months. 3. The arithmetic average of all monthly averages for the last 12 months. 4. Whether, based on subsection 8.5.3.1, the MRDL was violated.
System monitoring for chlorine dioxide under the requirements of section 8.4.8.	1. The dates, results, and locations of samples taken during the last quarter. 2. Whether, based on subsection 8.5.3.2, the MRDL was violated. 3. Whether the MRDL was exceeded in any two consecutive daily samples and whether the resulting violation was acute or non-acute.

1 The Division may choose to perform calculations and determine whether the MRDL was exceeded, in lieu of having the system report that information.

8.6.4 Disinfection byproduct precursors and enhanced coagulation or enhanced softening. Systems must report the information specified in the following table:

If you are a...	You must report[1]...
System monitoring monthly or quarterly for TOC under the requirements of subsection 8.4.9 and required to meet the enhanced coagulation or enhanced softening requirements in subsections 8.7.2.2 or 8.7.2.3.	1. The number of paired (source water and treated water, prior to continuous disinfection) samples taken during the last quarter. 2. The location, date, and result of each paired sample and associated alkalinity taken during the last quarter. 3. For each month in the reporting period that paired sample were taken, the arithmetic average of the percent reduction of TOC for each paired sample and the required TOC percent removal. 4. Calculations for determining compliance with the TOC percent removal requirements, as provided in section 8.7.3.1. 5. Whether the system is in compliance with the enhanced coagulation or enhanced softening percent removal requirements in subsection 8.7.2 for the last four quarters.
System monitoring monthly or quarterly for TOC under the requirements of subsection 8.4.9 and meeting one or more of the alternative compliance criteria in subsections 8.7.1.2 or 8.7.1.3.	1. The alternative compliance criterion that the system is using. 2. The number of paired (source water and treated water, prior to continuous disinfection) samples taken during the last quarter. 3. The location, date, and result of each paired sample and associated alkalinity taken during the last quarter. 4. The running annual arithmetic average based on monthly averages (or quarterly samples) of source water TOC for systems meeting a criterion in subsections 8.7.1.2.1 or 8.7.1.2.3 or of treated water TOC for systems meeting the criterion in subsection 8.7.1.2.2. 5. The running annual arithmetic average based on monthly averages (or quarterly samples) of source water SUVA for systems meeting the criterion in subsection 8.7.1.2.5 or of treated water SUVA for systems meeting the criterion in subsection 8.7.1.2.6. 6. The running annual average of source water alkalinity for systems meeting the criterion in subsection 8.7.1.2.3 and of treated water alkalinity for systems meeting the criterion in subsection 8.7.1.3.1. 7. The running annual average for both TTHM and HAA5 for systems meeting the criterion in subsection 8.7.1.2.3 or 8.7.1.2.4. 8. The running annual average of the amount of magnesium hardness removal (as CaCO3, in mg/L) for systems meeting the criterion in subsection 8.7.1.3.2. 9. Whether the system is in compliance with the particular alternative compliance criterion in subsections 8.7.1.2 or 8.7.1.3.

1 The Division may choose to perform calculations and determine whether the treatment technique was met, in lieu of having the system report the information.

8.7 Treatment Technique for Control of Disinfection Byproduct (DBP) Precursors:

8.7.1 Applicability.

8.7.1.1 Subpart H systems using conventional filtration treatment (as defined in section 1.0) must operate with enhanced coagulation or enhanced softening to achieve the TOC percent removal levels

specified in subsection 8.7.2 unless the system meets at least one of the alternative compliance criteria listed in subsections 8.7.1.2 or 8.7.1.3.

8.7.1.2 Alternative compliance criteria for enhanced coagulation and enhanced softening systems. Subpart H systems using conventional filtration treatment may use the alternative compliance criteria in subsections 8.7.1.2.1 through 8.7.1.2.6 to comply with this section in lieu of complying with subsection 8.7.2. Systems must still comply with monitoring requirements in 8.4.9.

8.7.1.2.1 The system's source water TOC level, measured according to 40 CFR 141.131(d)(3), is less than 2.0 mg/L, calculated quarterly as a running annual average.

8.7.1.2.2 The system's treated water TOC level, measured according to 40 CFR 141.131(d)(3), is less than 2.0 mg/L, calculated quarterly as a running annual average.

8.7.1.2.3 The system's source water TOC level, measured as required by 40 CFR 141.131(d)(3), is less than 4.0 mg/L, calculated quarterly as a running annual average; the source water alkalinity, measured according to 40 CFR 141.131(d)(1), is greater than 60 mg/L (as CaCO3), calculated quarterly as a running annual average; and either the TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively; or prior to the effective date for compliance in subsection 8.4.2, the system has made a clear and irrevocable financial commitment not later than the effective date for compliance in subsection 8.4.2 to use of technologies that will limit the levels of TTHMs and HAA5 to no more than 0.040 mg/L and 0.030 mg/L, respectively. Systems must submit evidence of a clear and irrevocable financial commitment, in addition to a schedule containing milestones and periodic progress reports for installation and operation of appropriate technologies, to the State for approval not later than the effective date for compliance in subsection 8.4.2. These technologies must be installed and operating not later than June 16, 2005. Failure to install and operate these technologies by the date in the approved schedule will constitute a violation of National Primary Drinking Water Regulations.

8.7.1.2.4 The TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively, and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

8.7.1.2.5 The system's source water SUVA, prior to any treatment and measured monthly according to 40 CFR 141.131(d)(4), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

8.7.1.2.6 The system's finished water SUVA, measured monthly according to 40 CFR 141.131(d)(4), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

8.7.1.3 Additional alternative compliance criteria for softening systems. Systems practicing enhanced softening that cannot achieve the TOC removals required by 8.7.2.2 may use the alternative compliance criteria in subsections 8.7.1.3.1 and 8.7.1.3.2 in lieu of complying with subsection 8.7.2. Systems must still comply with monitoring requirements in subsection 8.4.9.

8.7.1.3.1 Softening that results in lowering the treated water alkalinity to less than 60 mg/L (as CaCO3), measured monthly according to 40 CFR 141.131(d)(1) and calculated quarterly as a running annual average.

8.7.1.3.2 Softening that results in removing at least 10 mg/L of magnesium hardness (as $CaCO_3$), measured monthly according to subsection 8.4.5.1 and calculated quarterly as an annual running average.

8.7.2 Enhanced coagulation and enhanced softening performance requirements.

8.7.2.1 Systems must achieve the percent reduction of TOC specified in subsection 8.7.2.2 between the source water and the combined filter effluent, unless the State approves a system's request for alternate minimum TOC removal (Step 2) requirements under subsection 8.7.2.3.

8.7.2.2 Required Step 1 TOC reductions, indicated in the following table, are based upon specified source water parameters measured in accordance with 40 CFR 141.131(d). Systems practicing softening are required to meet the Step 1 TOC reductions in the far-right column (Source water alkalinity >120 mg/L) for the specified source water TOC:

Step 1 Required Removal of TOC by Enhanced Coagulation and Enhanced Softening for Subpart H Systems Using Conventional Treatment[1,2]

Source Water TOC	**Source water alkalinity, mg/L as $CaCO_3$ (in percentages)**

	0-60	>60-120	>120[3]
>2.0 – 4.0	35.0	25.0	15.0
>4.0 – 8.0	45.0	35.0	25.0
>8.0	50.0	40.0	30.0

1 Systems meeting at least one of the conditions in subsections 8.7.1.2.1 through 8.7.1.2.6 are not required to operate with enhanced coagulation.
2 Softening systems meeting one of the alternative compliance criteria in subsection 8.7.1.3 are not required to operate with enhanced softening.
3 Systems practicing softening must meet the TOC removal requirements in this column.

8.7.2.3 Subpart H conventional treatment systems that cannot achieve the Step 1 TOC removals required by subsection 8.7.2.2 due to water quality parameters or operational constraints must apply to the State, within three months of failure to achieve the TOC removals required by subsection 8.7.2.2, for approval of alternative minimum TOC (Step 2) removal requirements submitted by the system. If the State approves the alternative minimum TOC removal (Step 2) requirements, the State may make those requirements retroactive for the purposes of determining compliance. Until the State approves the alternate minimum TOC removal (Step 2) requirements, the system must meet the Step 1 TOC removals contained in subsection 8.7.2.2.

8.7.2.4 Alternate minimum TOC removal (Step 2) requirements. Applications made to the State by enhanced coagulation systems for approval of alternative minimum TOC removal (Step 2) requirements under subsection 8.7.2.3 must include, as a minimum, results of bench- or pilot-scale testing conducted under subsection 8.7.2.4.1 and used to determine the alternate enhanced coagulation level.

8.7.2.4.1 Alternate enhanced coagulation level is defined as coagulation at a coagulant dose and pH as determined by the method described in subsections 8.7.2.4.1 through 8.7.2.4.5 such that an incremental addition of 10 mg/L of alum (as aluminum) (or equivalent amount of ferric salt) results in a TOC removal of < 0.3 mg/L. The percent removal of TOC at this point on the ``TOC removal versus coagulant dose'' curve is then defined as the minimum TOC removal required for the system. Once approved by the State, this minimum requirement supersedes the minimum TOC removal required by the table in subsection 8.7.2.2. This requirement will be effective until such time as the State approves a new value based on the results of a new bench- and pilot-scale test. Failure to achieve State-set alternative minimum TOC removal levels is a violation of National Primary Drinking Water Regulations.

8.7.2.4.2 Bench- or pilot-scale testing of enhanced coagulation must be conducted by using representative water samples and adding 10 mg/L increments of alum (as aluminum) (or equivalent amounts of ferric salt) until the pH is reduced to a level less than or equal to the enhanced coagulation Step 2 target pH shown in the following table:

Enhanced Coagulation Step 2 Target pH

Alkalinity (mg/L as $CaCO_3$)	**Target pH**
0 – 60	5.5
>60 – 120	6.3
>120 – 240	7.0
>240	7.5

8.7.2.4.3 For waters with alkalinities of less than 60 mg/L for which addition of small amounts of alum or equivalent addition of iron coagulant drives the pH below 5.5 before significant TOC removal occurs, the system must add necessary chemicals to maintain the pH between 5.3 and 5.7 in samples until the TOC removal of 0.3 mg/L per 10 mg/L alum added (as aluminum) (or equivalent addition of iron coagulant) is reached.

8.7.2.4.4 The system may operate at any coagulant dose or pH necessary (consistent with other NPDWRs) to achieve the minimum TOC percent removal approved under subsection 8.7.2.3.

8.7.2.4.5 If the TOC removal is consistently less than 0.3 mg/L of TOC per 10 mg/L of incremental alum dose (as aluminum) at all dosages of alum (or equivalent addition of iron coagulant), the water is deemed to contain TOC not amenable to enhanced coagulation. The system may then apply to the State for a waiver of enhanced coagulation requirements.

8.7.3 Compliance Calculations:

8.7.3.1 Subpart H systems other than those identified in subsections 8.7.1.2 or 8.7.1.3 must comply with requirements contained in subsections 8.7.2.2 or 8.7.2.3. Systems must calculate compliance quarterly, beginning after the system has collected 12 months of data, by determining an annual average using the following method:

8.7.3.1.1 Determine actual monthly TOC removal, equal to: (1-(treated water TOC/source water TOC)) X 100.

8.7.3.1.2 Determine the required monthly TOC percent removal (from either the table in subsection 8.7.2.2 or from subsection 8.7.2.3).

8.7.3.1.3 Divide the value in subsection 8.7.3.1.1 by the value in section 8.7.3.1.2.

8.7.3.1.4 Add together the results of subsection 8.7.3.1.3 for the last 12 months and divide by 12.

8.7.3.1.5 If the value calculated in subsection 8.7.3.1.4 is less than 1.00, the system is not in compliance with the TOC percent removal requirements.

8.7.3.2 Systems may use the provisions in subsections 8.7.3.2.1 through 8.7.3.2.5 in lieu of the calculations in subsections 8.7.3.1.1 through 8.7.3.1.5 to determine compliance with TOC percent removal requirements.

8.7.3.2.1 In any month that the system's treated or source water TOC level, measured according to 40 CFR 141.131(d)(3), is less than 2.0 mg/L, the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 8.7.3.1.3) when calculating compliance under the provisions of subsection 8.7.3.1.

8.7.3.2.2 In any month that a system practicing softening removes at least 10 mg/L of magnesium hardness (as CaCO3), the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 8.7.3.1.3) when calculating compliance under the provisions of subsection 8.7.3.1.

8.7.3.2.3 In any month that the system's source water SUVA, prior to any treatment and measured according to 40 CFR 141.131(d)(4), is <2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 8.7.3.1.3) when calculating compliance under the provisions of subsection 8.7.3.1.

8.7.3.2.4 In any month that the system's finished water SUVA, measured according to 40 CFR 141.131(d)(4), is <2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 8.7.3.1.3) when calculating compliance under the provisions of section 8.7.3.1.

8.7.3.2.5 In any month that a system practicing enhanced softening lowers alkalinity below 60 mg/L (as CaCO3), the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 8.7.3.1.3) when calculating compliance under the provisions of subsection 8.7.3.1.

8.7.3.3 Subpart H systems using conventional treatment may also comply with the requirements of this section by meeting the criteria in subsection 8.7.1.2 or 8.7.1.3.

8.7.4 Treatment technique requirements for DBP precursors. The Division? identifies the following as treatment techniques to control the level of disinfection byproduct precursors in drinking water treatment and distribution systems: For Subpart H systems using conventional treatment, enhanced coagulation or enhanced softening.

8.8 Initial Distribution System Evaluations

8.8.1 General requirements.

8.8.1.1 The requirements of subsection 8.8 constitute national primary drinking water regulations. The regulations in this subpart establish monitoring and other requirements for identifying subsection 8.9 compliance monitoring locations for determining compliance with maximum contaminant levels for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5). You must use an Initial Distribution System Evaluation (IDSE) to determine locations with representative high TTHM and HAA5 concentrations throughout your distribution system. IDSEs are used in conjunction with, but separate from, subsection 8.4 compliance monitoring, to identify and select subsection 8.9 compliance monitoring locations.

8.8.1.2 Applicability. You are subject to these requirements if your system is a community water system that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light; or if your system is a nontransient noncommunity water system that serves at least 10,000 people and uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

8.8.1.3 Schedule.

8.8.1.3.1 You must comply with the requirements of this section on the schedule in the table in this paragraph.

If you serve this population	You must submit your standard monitoring plan or system specific study plan[1] or 40/30 certification[2] to the Division by or receive very small system waiver from the Division	You must complete your standard monitoring or system specific study by	You must submit your IDSE report to the Division by[3]
Systems that are not part of a combined distribution system and systems that serve the largest population in the combined distribution system			
(i) >100,000	October 1, 2006	September 30, 2008	January 1, 2009
(ii) 50,000-99,999	April 1, 2007	March 31, 2009	July 1, 2009
(iii) 10,000-49,999	October 1, 2007	September 30, 2009	January 1, 2010
(iv) <10,000 (CWS only)	April 1, 2008	March 31, 2010	July 1, 2010
Other systems that are part of a combined distribution system			
(v) Wholesale system or consecutive system	At the same time as the system with the earliest compliance date in the combined distribution system.	At the same time as the system with the earliest compliance date in the combined distribution system.	At the same time as the system with the earliest compliance date in the combined distribution system.

[1] If, within 12 months after the date identified in this column, the Division does not approve your plan or notify you that it has not yet completed its review, you may consider the plan that you submitted as approved. You must implement that plan and you must complete standard monitoring or a system specific study no later than the date identified in the third column.

[2] You must submit your 40/30 certification under subsection 8.8.4 by the date indicated.

[3] If, within three months after the date identified in this column (nine months after the date identified in this column if you must comply on the schedule in section iii of the table), the Division does not approve your IDSE report or notify you that it has not yet completed its review, you may consider the report that you submitted as approved and you must implement the recommended monitoring as required in subsection 8.9.

8.8.1.3.2 For the purpose of the schedule in subsection 8.8.1.3.1, the Division may determine that the combined distribution system does not include certain consecutive systems based on factors such as receiving water from a wholesale system only on an emergency basis or receiving only a small percentage and small volume of water from a wholesale system. The Division may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

8.8.1.4 You must conduct standard monitoring that meets the requirements in subsection 8.8.2, or a system specific study that meets the requirements in section 8.8.3, or certify to the State that you meet 40/30 certification criteria under subsection 8.8.4, or qualify for a very small system waiver under subsection 8.8.5.

8.8.1.4.1 You must have taken the full complement of routine TTHM and HAA5 compliance samples required of a system with your population and source water under subsection 8.4 of this part (or you must have taken the full complement of reduced TTHM and HAA5 compliance samples required of a system with your population and source water under subsection 8.4 if you meet reduced monitoring criteria under subsection 8.4 of this part) during the period specified in subsection 8.8.4.1 to meet the 40/30 certification criteria in subsection 8.8.4. You must have taken TTHM and HAA5 samples under subsections 8.4.5.1 and 8.4.6 to be eligible for the very small system waiver in subsection 8.8.5.

8.8.1.4.2 If you have not taken the required samples, you must conduct standard monitoring that meets the requirements in subsection 8.8.2, or a system specific study that meets the requirements in subsection 8.8.3.

8.8.1.5 You must use only the analytical methods specified in subsection 8.4.5.1, or otherwise approved by EPA for monitoring under this section, to demonstrate compliance with the requirements of this section.

8.8.1.6 IDSE results will not be used for the purpose of determining compliance with MCLs in subsection 6.2.1.2.

8.8.2 Standard monitoring.

8.8.2.1 Standard monitoring plan. Your standard monitoring plan must comply with subsections 8.8.2.1 through 8.8.2.1.4. You must prepare and submit your standard monitoring plan to the Division according to the schedule in subsection 8.8.1.3.

8.8.2.1.1 Your standard monitoring plan must include a schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating locations and dates of all projected standard monitoring, and all projected compliance monitoring in subsection 8.4.

8.8.2.1.2 Your standard monitoring plan must include justification of standard monitoring location selection and a summary of data you relied on to justify standard monitoring location selection.

8.8.2.1.3 Your standard monitoring plan must specify the population served and system type (subpart H or ground water).

8.8.2.1.4 You must retain a complete copy of your standard monitoring plan submitted under this subsection (8.8.2.1), including any Division modification of your standard monitoring plan, for as long as you are required to retain your IDSE report under subsection 8.8.2.3.4.

8.8.2.2 Standard monitoring.

8.8.2.2.1 You must monitor as indicated in the table in this subsection (8.8.2.2.1). You must collect dual sample sets at each monitoring location. One sample in the dual sample set must be analyzed for TTHM. The other sample in the dual sample set must be analyzed for HAA5. You must conduct one monitoring period during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature. You must review available compliance, study, or operational data to determine the peak historical month for TTHM or HAA5 levels or warmest water temperature.

Source Water Type	Population Size Category	Monitoring periods and frequency of sampling	Distribution system monitoring locations[1]				
			Total per monitoring period	Near entry points	Average residence time	High TTHM locations	High HAA5 locations

Subpart H	<500 consecutive systems	One (during peak historical month)[2]	2	1	.....	1	
	<500 non-consecutive systems	.....	2	.....	.....	1	1
	500-3,300 consecutive systems	Four (every 90 days)	2	1	.....	1	
	500-3,300 non-consecutive systems	.....	2	.....	.....	1	1
	3,301-9,999	.....	4	.....	1	2	1
	10,000-49,999	Six (every 60 days)	8	1	2	3	2
	50,000-249,999	.....	16	3	4	5	4
	250,000-999,999	.....	24	4	6	8	6
	1,000,000-4,999,999	.....	32	6	8	10	8
	>5,000,000	.....	40	8	10	12	10
Ground Water	<500 consecutive systems	One (during peak historical month)[2]	2	1	.....	1	
	<500 non-consecutive systems	.....	2	.....	.....	1	1
	500-9,999	Four (every 90 days)	2	.....	.....	1	1
	10,000-99,999	.....	6	1	1	2	1
	100,000-499,999	.....	8	1	1	3	3
	>500,000	.....	12	2	2	4	4

[1] A dual sample set (i.e., a TTHM and an HAA5 sample) must be taken at each monitoring location during each monitoring period.

[2] The peak historical month is the month with the highest TTHM or HAA5 levels or the warmest water temperature.

8.8.2.2.2 You must take samples at locations other than the existing monitoring locations in subsection 8.4. Monitoring locations must be distributed throughout the distribution system.

8.8.2.2.3 If the number of entry points to the distribution system is fewer than the specified number of entry point monitoring locations, excess entry point samples must be replaced equally at high TTHM and HAA5 locations. If there is an odd extra location number, you must take a sample at a high TTHM location. If the number of entry points to the distribution system is more than the

specified number of entry point monitoring locations, you must take samples at entry points to the distribution system having the highest annual water flows.

8.8.2.2.4 Your monitoring under this subsection 8.8.2.2 may not be reduced under the provisions of subsection 9.2.5.

8.8.2.3 IDSE report. Your IDSE report must include the elements required in subsections 8.8.2.3.1 through 8.8.2.3.4. You must submit your IDSE report to the Division according to the schedule in subsection 8.8.1.3.

8.8.2.3.1 Your IDSE report must include all TTHM and HAA5 analytical results from compliance monitoring under subsection 8.4 and all standard monitoring conducted during the period of the IDSE as individual analytical results and LRAAs presented in a tabular or spreadsheet format acceptable to the Division. If changed from your standard monitoring plan submitted under subsection 8.8.1, your report must also include a schematic of your distribution system, the population served, and system type (subpart H or ground water).

8.8.2.3.2 Your IDSE report must include an explanation of any deviations from your approved standard monitoring plan.

8.8.2.3.3 You must recommend and justify compliance monitoring locations and timing under subsection 8.9 based on the protocol in subsection 8.8.6.

8.8.2.3.4 You must retain a complete copy of your IDSE report submitted under this section for 10 years after the date that you submitted your report. If the Division modifies the monitoring requirements under subsection 8.9 that you recommended in your IDSE report or if the Division approves alternative monitoring locations, you must keep a copy of the Division's notification on file for 10 years after the date of the Division's notification. You must make the IDSE report and any Division notification available for review by the Division or the public.

8.8.3 System specific studies.

8.8.3.1 System specific study plan. Your system specific study plan must be based on either existing monitoring results as required under subsection 8.8.1.1 or modeling as required under subsection 8.8.1.2. You must prepare and submit your system specific study plan to the Division according to the schedule in subsection 8.8.1.3.

8.8.3.1.1 Existing monitoring results. You may comply by submitting monitoring results collected before you are required to begin monitoring under subsection 8.8.1.3. The monitoring results and analysis must meet the criteria in subsections 8.8.3.1.1.1 and 8.8.3.1.1.2.

8.8.3.1.1.1 Minimum requirements.

8.8.3.1.1.1.1 TTHM and HAA5 results must be based on samples collected and analyzed in accordance with subsection 8.4.5.1. Samples must be collected no earlier than five years prior to the study plan submission date.

8.8.3.1.1.1.2 The monitoring locations and frequency must meet the conditions identified in this subsection 8.8.3.1.1.1.2. Each location must be sampled once during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature for every 12 months of data submitted for that location. Monitoring results must include all compliance monitoring results under subsection 8.4 plus additional monitoring results as necessary to meet minimum sample requirements.

System Type	Population size category	Number of monitoring locations	Number of samples	
			TTHM	HAA5

Subpart H	<500	3	3	3
	500-3,300	3	9	9
	3,301-9,999	6	36	36
	10,000-49,999	12	72	72
	50,000-249,999	24	144	144
	250,000-999,999	36	216	216
	1,000,000-4,999,999	48	288	288
	>5,000,000	60	360	360
Ground Water	<500	3	3	3
	500-9,999	3	9	9
	10,000-99,999	12	48	48
	100,000-499,999	18	72	72
	>500,000	24	96	96

8.8.3.1.1.2 Reporting monitoring results. You must report the information in this subsection 8.8.3.1.1.2.

8.8.3.1.1.2.1 You must report previously collected monitoring results and certify that the reported monitoring results include all compliance and non-compliance results generated during the time period beginning with the first reported result and ending with the most recent results collected under subsection 8.4.

8.8.3.1.1.2.2 You must certify that the samples were representative of the entire distribution system and that the treatment and distribution system have not changed significantly since the samples were collected.

8.8.3.1.1.2.3 Your study monitoring plan must include a schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed or planned system specific study monitoring.

8.8.3.1.1.2.4 Your system specific study plan must specify the population served and system type (subpart H or ground water).

8.8.3.1.1.2.5 You must retain a complete copy of your system specific study plan submitted under this subsection 8.8.3.1.1, including any Division modification of your system specific study plan, for as long as you are required to retain your IDSE report under subsection 8.8.3.2.5.

8.8.3.1.1.2.6 If you submit previously collected data that fully meet the number of samples required under subsection 8.8.3.1.1.1.2 and the Division rejects some of the data, you must either conduct additional monitoring to replace rejected data on a schedule the Division approves or conduct standard monitoring under subsection 8.8.2.

8.8.3.1.2 Modeling. You may comply through analysis of an extended period simulation hydraulic model. The extended period simulation hydraulic model and analysis must meet the criteria in this subsection 8.8.3.1.2.

8.8.3.1.2.1 Minimum requirements.

8.8.3.1.2.1.1 The model must simulate 24 hour variation in demand and show a consistently repeating 24 hour pattern of residence time.

8.8.3.1.2.1.2 The model must represent the criteria listed in subsections 8.8.3.1.2.1.2.1 through 8.8.3.1.2.1.2.9.

8.8.3.1.2.1.2.1 75% of pipe volume;

8.8.3.1.2.1.2.2 50% of pipe length;

8.8.3.1.2.1.2.3 All pressure zones;

8.8.3.1.2.1.2.4 All 12-inch diameter and larger pipes;

8.8.3.1.2.1.2.5 All 8-inch and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps, and control valves, or are known or expected to be significant conveyors of water;

8.8.3.1.2.1.2.6 All 6-inch and larger pipes that connect remote areas of a distribution system to the main portion of the system;

8.8.3.1.2.1.2.7 All storage facilities with standard operations represented in the model; and

8.8.3.1.2.1.2.8 All active pump stations with controls represented in the model; and

8.8.3.1.2.1.2.9 All active control valves.

8.8.3.1.2.1.3 The model must be calibrated, or have calibration plans, for the current configuration of the distribution system during the period of high TTHM formation potential. All storage facilities must be evaluated as part of the calibration process. All required calibration must be completed no later than 12 months after plan submission.

8.8.3.1.2.2 Reporting modeling. Your system specific study plan must include the information in this subsection 8.8.3.1.2.2.

8.8.3.1.2.2.1 Tabular or spreadsheet data demonstrating that the model meets requirements in subsection 8.8.3.1.2.1.2.

8.8.3.1.2.2.2 A description of all calibration activities undertaken, and if calibration is complete, a graph of predicted tank levels versus measured tank levels for the storage facility with the highest residence time in each pressure zone, and a time series graph of the residence time at the longest residence time storage facility in the distribution system showing the predictions for the entire simulation period (i.e., from time zero until the time it takes to for the model to reach a consistently repeating pattern of residence time).

8.8.3.1.2.2.3 Model output showing preliminary 24 hour average residence time predictions throughout the distribution system.

8.8.3.1.2.2.4 Timing and number of samples representative of the distribution system planned for at least one monitoring period of TTHM and HAA5 dual sample monitoring at a number of locations no less than would be required for the system under standard monitoring in section 8.8.2 during the historical month of high TTHM. These samples must be taken at locations other than existing compliance monitoring locations in subsection 8.4.

8.8.3.1.2.2.5 Description of how all requirements will be completed no later than 12 months after you submit your system specific study plan.

8.8.3.1.2.2.6 Schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed system specific study monitoring (if calibration is complete) and all compliance monitoring under subsection 8.4.

8.8.3.1.2.2.7 Population served and system type (subpart H or ground water).

8.8.3.1.2.2.8 You must retain a complete copy of your system specific study plan submitted under this subsection 8.8.3.1.2, including any Division modification of your system specific study plan, for as long as you are required to retain your IDSE report under subsection 8.8.3.1.2.7.

8.8.3.1.2.3 If you submit a model that does not fully meet the requirements under subsection 8.8.3.1.2, you must correct the deficiencies and respond to Division inquiries concerning the model. If you fail to correct deficiencies or respond to inquiries to the Division's satisfaction, you must conduct standard monitoring under 8.8.2.

8.8.3.2 IDSE report. Your IDSE report must include the elements required in subsections 8.8.3.2.1 through 8.8.3.2.6. You must submit your IDSE report according to the schedule in subsection 8.8.1.3.

8.8.3.2.1 Your IDSE report must include all TTHM and HAA5 analytical results from compliance monitoring under subsection 8.4 and all system specific study monitoring conducted during the period of the system specific study presented in a tabular or spreadsheet format acceptable to the Division. If changed from your system specific study plan submitted under paragraph (a) of this section, your IDSE report must also include a schematic of your distribution system, the population served, and system type (subpart H or ground water).

8.8.3.2.2 If you used the modeling provision under subsection 8.8.3.1.2, you must include final information for the elements described in subsection 8.8.3.1.2.2, and a 24-hour time series graph of residence time for each compliance monitoring location selected under subsection 8.9.

8.8.3.2.3 You must recommend and justify compliance monitoring locations under subsection 8.9 and timing based on the protocol in subsection 8.8.6.

8.8.3.2.4 Your IDSE report must include an explanation of any deviations from your approved system specific study plan.

8.8.3.2.5 Your IDSE report must include the basis (analytical and modeling results) and justification you used to select the recommended monitoring locations under subsection 8.9.

8.8.3.2.6 You may submit your IDSE report in lieu of your system specific study plan on the schedule identified in subsection 8.8.1.3 for submission of the system specific study plan if you believe that you have the necessary information by the time that the system specific study plan is due. If you elect this approach, your IDSE report must also include all information required under subsection 8.8.3.1.

8.8.3.2.7 You must retain a complete copy of your IDSE report submitted under this section for 10 years after the date that you submitted your IDSE report. If the Division modifies the monitoring requirements under subsection 8.9 that you recommended in your IDSE report or if the Division approves alternative monitoring locations, you must keep a copy of the Division's notification on file for 10 years after the date of the Division's notification. You must make the IDSE report and any Division notification available for review by the Division or the public.

8.8.4 40/30 certification.

8.8.4.1 Eligibility. You are eligible for 40/30 certification if you had no TTHM or HAA5 monitoring violations under subsection 8.4 of this part and no individual sample exceeded 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 during an eight consecutive calendar quarter period beginning no earlier than the date specified in this subsection (8.8.4.1).

If your 40/30 certification is due	**Then your eligibility for 40/30 certification is based on eight consecutive calendar quarters of compliance monitoring results under section 8.4 beginning no earlier than**[1]
(1) October 1, 2006	January 2004
(2) April 1, 2007	January 2004
(3) October 1, 2007	January 2005
(4) April 1, 2008	January 2005

[1] Unless you are on reduced monitoring under section 8.4 of this part and were not required to monitor during the specified period. If you did not monitor during the specified period, you must base your eligibility on compliance samples taken during the 12 months preceding the specified period.

8.8.4.2 40/30 certification.

8.8.4.2.1 You must certify to your Division that every individual compliance sample taken under subsection 8.4 of this part during the periods specified in subsection 8.8.4.1 were < =0.040 mg/L for TTHM and < =0.030 mg/L for HAA5, and that you have not had any TTHM or HAA5 monitoring violations during the period specified in subsection 8.8.4.1.

8.8.4.2.2 The Division may require you to submit compliance monitoring results, distribution system schematics, and/or recommended compliance monitoring under subsection 8.9 locations in addition to your certification. If you fail to submit the requested information, the Division may require standard monitoring under subsection 8.8.2 or a system specific study under subsection 8.8.3.

8.8.4.2.3 The Division may still require standard monitoring under subsection 8.8.2 or a system specific study under subsection 8.8.3 even if you meet the criteria in subsection 8.8.4.1.

8.8.4.2.4 You must retain a complete copy of your certification submitted under this subsection for 10 years after the date that you submitted your certification. You must make the certification, all data upon which the certification is based, and any Division notification available for review by the Division or the public.

8.8.5 Very small system waivers.

8.8.5.1 If you serve fewer than 500 people and you have taken TTHM and HAA5 samples under subsection 8.4 of this part, you are not required to comply with this section unless the Division notifies you that you must conduct standard monitoring under subsection 8.8.2 or a system specific study under subsection 8.8.3.

8.8.5.2 If you have not taken TTHM and HAA5 samples under subsection 8.4 of this part or if the Division notifies you that you must comply with this section, you must conduct standard monitoring under subsection 8.8.2 or a system specific study under subsection 8.8.3.

8.8.6 Subsection 8.9 compliance monitoring location recommendations.

8.8.6.1 Your IDSE report must include your recommendations and justification for where and during what month(s) TTHM and HAA5 monitoring for subsection 8.9 of this part should be conducted. You must base your recommendations on the criteria in subsections 8.8.6.2 through 8.8.6.5.

8.8.6.2 You must select the number of monitoring locations specified in the table in this subsection (8.8.6.2). You will use these recommended locations as routine compliance monitoring locations for subsection 8.9, unless the Division requires different or additional locations. You should distribute locations throughout the distribution system to the extent possible.

Source water type	**Population size category**	**Monitoring frequency**[1]	**Distribution system monitoring location**			
			Total per monitoring period[2]	**Highest TTHM locations**	**Highest HAA5 locations**	**Existing section 8.4 compliance locations**
Subpart H	<500	Per year	2	1	1	.....
	500-3,300	Per quarter	2	1	1	
	3,301-9,999	Per quarter	2	1	1	.....
	10,000-49,999	Per quarter	4	2	1	1
	50,000-249,999	Per quarter	8	3	3	2
	250,000-999,999	Per quarter	12	5	4	3
	1,000,000-4,999,999	Per quarter	16	6	6	4
	>5,000,000	Per quarter	20	8	7	5
Ground water						
	<500	Per year	2	1	1	
	500-9,999	Per year	2	1	1	
	10,000-99,999	Per quarter	4	2	1	1
	100,000-499,999	Per quarter	6	3	2	1
	>500,000	Per quarter	8	3	3	2

[1] All systems must monitor during month of highest DBP concentrations.

[2] Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for subpart H systems serving 500-3,300. Systems on annual monitoring and subpart H systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. Only one location with a dual sample set per

monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location, and month, if monitored annually).

8.8.6.3 You must recommend compliance monitoring locations under subsection 8.9 based on standard monitoring results, system specific study results, and compliance monitoring results under subsection 8.4. You must follow the protocol in subsections 8.8.6.3.1 through 8.8.6.3.8. If required to monitor at more than eight locations, you must repeat the protocol as necessary. If you do not have existing compliance monitoring results from subsection 8.4 or if you do not have enough existing compliance monitoring results from subsection 8.4, you must repeat the protocol, skipping the provisions of subsections 8.8.6.3.3 and 8.8.6.3.7 as necessary, until you have identified the required total number of monitoring locations.

8.8.6.3.1 Location with the highest TTHM LRAA not previously selected as a monitoring location under subsection 8.9.

8.8.6.3.2 Location with the highest HAA5 LRAA not previously selected as a monitoring location under subsection 8.9.

8.8.6.3.3 Existing average residence time compliance monitoring location under subsection 8.4 (maximum residence time compliance monitoring location for ground water systems) with the highest HAA5 LRAA not previously selected as a monitoring location under subsection 8.9.

8.8.6.3.4 Location with the highest TTHM LRAA not previously selected as a monitoring location under subsection 8.9.

8.8.6.3.5 Location with the highest TTHM LRAA not previously selected as a monitoring location under subsection 8.9.

8.8.6.3.6 Location with the highest HAA5 LRAA not previously selected as a monitoring location under subsection 8.9.

8.8.6.3.7 Existing average residence time compliance monitoring location under subsection 8.4 (maximum residence time compliance monitoring location for ground water systems) with the highest TTHM LRAA not previously selected as a monitoring location under subsection 8.9.

8.8.6.3.8 Location with the highest HAA5 LRAA not previously selected as a monitoring location under subsection 8.9.

8.8.6.4 You may recommend locations other than those specified in subsection 8.8.6.3 if you include a rationale for selecting other locations. If the Division approves the alternate locations, you must monitor at these locations to determine compliance under subsection 8.9 of this part.

8.8.6.5 Your recommended schedule must include monitoring under subsection 8.9 during the peak historical month for TTHM and HAA5 concentration, unless the Division approves another month. Once you have identified the peak historical month, and if you are required to conduct routine monitoring at least quarterly, you must schedule compliance monitoring under subsection 8.9 at a regular frequency of every 90 days or fewer.

8.9 Stage 2 Disinfection Byproducts Requirements

8.9.1 General requirements.

8.9.1.1 General. The requirements of subsection 8.9 constitute national primary drinking water regulations. The regulations in this section establish monitoring and other requirements for achieving compliance with maximum contaminant levels based on locational running annual averages (LRAA) for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5), and for achieving compliance with maximum residual disinfectant residuals for chlorine and chloramine for certain consecutive systems.

8.9.1.2 Applicability. You are subject to these requirements if your system is a community water system or a nontransient noncommunity water system that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

8.9.1.3 Schedule. You must comply with the requirements in this section on the schedule in the following table based on your system type.

If you are this type of system	**You must comply with 8.9 monitoring by:**[1]
Systems that are not part of a combined distribution system that serve the largest population in the combined distribution system	

8.9.1.3.1 System serving >100,000	April 1, 2012
8.9.1.3.2 System Serving 50,000 – 99,999	October 1, 2012
8.9.1.3.3 System serving 10,000 – 49,999	October 1, 2013
8.9.1.3.4 System serving <10,000	October 1, 2013 if no *Cryptosporidium* monitoring is required under subsection 8.10.2.1.4 or October 1, 2014 if *Cryptosporidium* monitoring is required under subsections 8.10.2.1.4 or 8.10.2.1.6
Other systems that are part of a combined distribution system	
8.9.1.3.5 Consecutive system or wholesale system	At the same time as the system with the earliest compliance date in the combined distribution system.

[1] The Division may grant up to an additional 24 months for compliance with MCLs and operational evaluation levels if you require capital improvements to comply with an MCL.

8.9.1.3.6 Your monitoring frequency is specified in subsection 8.9.2.1.2.

8.9.1.3.6.1 If you are required to conduct quarterly monitoring, you must begin monitoring in the first full calendar quarter that includes the compliance date in the table in this subsection 8.9.1.3.

8.9.1.3.6.2 If you are required to conduct monitoring at a frequency that is less than quarterly, you must begin monitoring in the calendar month recommended in the IDSE report prepared under subsections 8.8.2 or 8.8.3 or the calendar month identified in the monitoring plan developed under subsection 8.9.3 no later than 12 months after the compliance date in this table.

8.9.1.3.7 If you are required to conduct quarterly monitoring, you must make compliance calculations at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter (or earlier if the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters). If you are required to conduct monitoring at a frequency that is less than quarterly, you must make compliance calculations beginning with the first compliance sample taken after the compliance date.

8.9.1.3.8 For the purpose of the schedule in this subsection (8.9.1.3), the Division may determine that the combined distribution system does not include certain consecutive systems based on factors such as receiving water from a wholesale system only on an emergency basis or receiving only a small percentage and small volume of water from a wholesale system. The Division may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

8.9.1.4 Monitoring and compliance.

8.9.1.4.1 Systems required to monitor quarterly. To comply with MCLs under subsection 8.9 in subsection 6.2.1.2, you must calculate LRAAs for TTHM and HAA5 using monitoring results collected under this section and determine that each LRAA does not exceed the MCL. If you fail to complete four consecutive quarters of monitoring, you must calculate compliance with the MCL based on the average of the available data from the most recent four quarters. If you take more than one sample per quarter at a monitoring location, you must average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

8.9.1.4.2 Systems required to monitor yearly or less frequently. To determine compliance with MCLs under subsection 8.9 in subsection 6.2.1.2, you must determine that each sample taken is less than the MCL. If any sample exceeds the MCL, you must comply with the requirements of subsection 8.8.6. If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

8.9.1.5 Violation. You are in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if you fail to monitor.

8.9.2 Routine monitoring.

8.9.2.1 Monitoring.

8.9.2.1.1 If you submitted an IDSE report, you must begin monitoring at the locations and months you have recommended in your IDSE report submitted under subsection 8.8.6 following the schedule in subsection 8.9.1.3, unless the Division requires other locations or additional locations after its review. If you submitted a 40/30 certification under section 8.8.4 or you qualified for a very small system waiver under subsection 8.8.5 or you are a nontransient noncommunity water system serving <10,000, you must monitor at the location(s) and dates identified in your monitoring plan in subsection 8.4.6, updated as required by subsection 8.9.3.

8.9.2.1.2 You must monitor at no fewer than the number of locations identified in this subsection (8.9.2.1.2).

Source water type	**Population size category**	**Monitoring frequency[1]**	**Distribution system monitoring location total per monitoring period[2]**
Subpart H:			
	<500	Per year	2
	500-3,300	Per quarter	2
	3,301-9,999	Per quarter	2
	10,000-49,999	Per quarter	4
	50,000-249,999	Per quarter	8
	250,000- 999,999	Per quarter	12
	1,000,000- 4,999,999	Per quarter	16
	>5,000,000	Per quarter	20
Ground water:			
	<500	Per year	2
	500-9,999	Per year	2
	10,000-99,999	Per quarter	4
	100,000-499,999	Per quarter	6
	>500,000	Per quarter	8

[1] All systems must monitor during month of highest DBP concentrations.

[2] Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for subpart H systems serving 500-3,300. Systems on annual monitoring and subpart H systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. Only one location with a dual sample set per monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location (and month, if monitored annually).

8.9.2.1.3 If you are an undisinfected system that begins using a disinfectant other than UV light after the dates in section 8.8 for complying with the Initial Distribution System Evaluation requirements, you must consult with the Division to identify compliance monitoring locations for this section. You must then develop a monitoring plan under subsection 8.9.3 that includes those monitoring locations.

8.9.2.2 Analytical methods. You must use an approved method listed in subsection 8.4.5.1 for TTHM and HAA5 analyses in this section. Analyses must be conducted by laboratories that have received certification by EPA or the Division as specified in subsection 8.4.5.1.

8.9.3 Monitoring plan.

8.9.3.1 You must develop and implement a monitoring plan to be kept on file for Division and public review. The monitoring plan must contain the elements in subsections 8.9.3.1.1.1 through 8.9.3.1.1.4 and be complete no later than the date you conduct your initial monitoring under this section.

8.9.3.1.1 Monitoring locations;

8.9.3.1.2 Monitoring dates;

8.9.3.1.3 Compliance calculation procedures; and

8.9.3.1.4 Monitoring plans for any other systems in the combined distribution system if the Division has reduced monitoring requirements under the Division authority in the CFR section 142.16(m) (Copies available at the Office of Drinking Water upon request).

8.9.3.2 If you were not required to submit an IDSE report under either subsection 8.8.2 or subsection 8.8.3, and you do not have sufficient subsection 8.4 monitoring locations to identify the required number of subsection 8.9 compliance monitoring locations indicated in subsection 8.8.6.2, you must identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of compliance monitoring locations have been identified. You must also provide the rationale for identifying the locations as having high levels of TTHM or HAA5. If you have more subsection 8.4 monitoring locations than required for subsection 8.9 compliance monitoring in subsection 8.8.6.2, you must identify which locations you will use for subsection 8.9 compliance monitoring by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of subsection 8.9 compliance monitoring locations have been identified.

8.9.3.3 If you are a subpart H system serving >3,300 people, you must submit a copy of your monitoring plan to the Division prior to the date you conduct your initial monitoring under this section, unless your IDSE report submitted under subsection 8.8 of this part contains all the information required by this section.

8.9.3.4 You may revise your monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for Division-approved reasons, after consultation with the Division regarding the need for changes and the appropriateness of changes. If you change monitoring locations, you must replace existing compliance monitoring locations with the lowest LRAA with new locations that reflect the current distribution system locations with expected high TTHM or HAA5 levels. The Division may also require modifications in your monitoring plan. If you are a subpart H system serving >3,300 people, you must submit a copy of your modified monitoring plan to the Division prior to the date you are required to comply with the revised monitoring plan.

8.9.4 Reduced monitoring.

8.9.4.1 You may reduce monitoring to the level specified in the table in this subsection all monitoring locations. You may only use data collected under the provisions of this subsection or subsection 8.4 of this part to qualify for reduced monitoring. In addition, the source water annual average TOC level, before any treatment, must be <=4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either subsection 8.4.7.1.3 or subsection 8.4.9.

Source water type	**Population size category**	**Monitoring frequency1**	**Distribution system monitoring location per monitoring period**
Subpart H:			
	<500	Per year	Monitoring may not be reduced
	500-3,300	Per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.

	3,301-9,999	Per quarter	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	10,000-49,999	Per quarter	2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs.
	50,000-249,999	Per quarter	4 dual sample sets - at the locations with the two highest TTHM and two highest HAA5 LRAAs.
	250,000- 999,999	Per quarter	6 dual sample sets - at the locations with the three highest TTHM and three highest HAA5 LRAAs.
	1,000,000- 4,999,999	Per quarter	8 dual sample sets - at the locations with the four highest TTHM and four highest HAA5 LRAAs.
	>5,000,000	Per quarter	10 dual sample sets - at the locations with the five highest TTHM and five highest HAA5 LRAAs.
Ground water:			
	<500	Every third year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
	500-9,999	Per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
	10,000-99,999	Per year	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	100,000-499,999	Per quarter	2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs.
	>500,000	Per quarter	4 dual sample sets - at the locations with the two highest TTHM and two highest HAA5 LRAAs.

[1] Systems on quarterly monitoring must take dual sample sets every 90 days.

8.9.4.2 You may remain on reduced monitoring as long as the TTHM LRAA <0.040 mg/L and the HAA5 LRAA <0.030 mg/L at each monitoring location (for systems with quarterly reduced monitoring) or each TTHM sample <0.060 mg/L and each HAA5 sample <0.045 mg/L (for systems with annual or less frequent monitoring). In addition, the source water annual average TOC level, before any treatment, must be <4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either subsections 8.4.7.1.3 or 8.4.9.

8.9.4.3 If the LRAA based on quarterly monitoring at any monitoring location exceeds either 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 or if the annual (or less frequent) sample at any location exceeds either 0.060 mg/L for TTHM or 0.045 mg/L for HAA5, or if the source water annual average TOC level, before any treatment, >4.0 mg/L at any treatment plant treating surface water or ground water under the direct influence of surface water, you must resume routine monitoring under subsection 8.9.2 or begin increased monitoring if subsection 8.9.6 applies.

8.9.4.4 The Division may return your system to routine monitoring at the Division's discretion.

8.9.5 Additional requirements for consecutive systems. If you are a consecutive system that does not add a disinfectant but delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light, you must comply with analytical and monitoring requirements for chlorine and chloramines in subsections 8.4.5.1 and 8.4.8.1 and the compliance requirements in subsection 8.5.3.1 beginning April 1, 2009, unless required earlier by the Division, and report monitoring results under subsection 8.6.3.

8.9.6 Conditions requiring increased monitoring.

8.9.6.1 If you are required to monitor at a particular location annually or less frequently than annually under subsections 8.9.2 or 8.9.4, you must increase monitoring to dual sample sets once per quarter (taken every 90 days) at all locations if a TTHM sample is >0.080 mg/L or a HAA5 sample is >0.060 mg/L at any location.

8.9.6.2 You are in violation of the MCL when the LRAA exceeds the subsection 8.9 MCLs in subsection 6.2.1.2, calculated based on four consecutive quarters of monitoring (or the LRAA calculated based on fewer than four quarters of data if the MCL would be exceeded regardless of the monitoring results of subsequent quarters). You are in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if you fail to monitor.

8.9.6.3 You may return to routine monitoring once you have conducted increased monitoring for at least four consecutive quarters and the LRAA for every monitoring location is <0.060 mg/L for TTHM and <0.045 mg/L for HAA5.

8.9.7 Operational evaluation levels.

8.9.7.1 You have exceeded the operational evaluation level at any monitoring location where the sum of the two previous quarters' TTHM results plus twice the current quarter's TTHM result, divided by 4 to determine an average, exceeds 0.080 mg/L, or where the sum of the two previous quarters' HAA5 results plus twice the current quarter's HAA5 result, divided by 4 to determine an average, exceeds 0.060 mg/L.

8.9.7.2.1 If you exceed the operational evaluation level, you must conduct an operational evaluation and submit a written report of the evaluation to the Division no later than 90 days after being notified of the analytical result that causes you to exceed the operational evaluation level. The written report must be made available to the public upon request.

8.9.7.2.2 Your operational evaluation must include an examination of system treatment and distribution operational practices, including storage tank operations, excess storage capacity, distribution system flushing, changes in sources or source water quality, and treatment changes or problems that may contribute to TTHM and HAA5 formation and what steps could be considered to minimize future exceedences.

8.9.7.2.2.1 You may request and the Division may allow you to limit the scope of your evaluation if you are able to identify the cause of the operational evaluation level exceedance.

8.9.7.2.2.2 Your request to limit the scope of the evaluation does not extend the schedule in subsection 8.9.7.2.1 for submitting the written report. The Division must approve this limited scope of evaluation in writing and you must keep that approval with the completed report.

8.9.8 Requirements for remaining on reduced TTHM and HAA5 monitoring based on results under subsection 8.4. You may remain on reduced monitoring after the dates identified in subsection 8.9.1.3 for compliance

with this section only if you qualify for a 40/30 certification under subsection 8.8.4 or have received a very small system waiver under subsection 8.8.5, plus you meet the reduced monitoring criteria in subsection 8.9.4.1, and you do not change or add monitoring locations from those used for compliance monitoring under subsection 8.4 of this part. If your monitoring locations under this section differ from your monitoring locations under subsection 8.4 of this part, you may not remain on reduced monitoring after the dates identified in subsection 8.9.1.3 for compliance with this section.

8.9.9 Requirements for remaining on increased TTHM and HAA5 monitoring based on results from subsection 8.4. If you were on increased monitoring under subsection 8.4.7.1, you must remain on increased monitoring until you qualify for a return to routine monitoring under subsection 8.9.6.3. You must conduct increased monitoring under subsection 8.9.6 at the monitoring locations in the monitoring plan developed under subsection 8.9.3 beginning at the date identified in subsection 8.9.1.3 for compliance with this subsection and remain on increased monitoring until you qualify for a return to routine monitoring under subsection 8.9.6.3.

8.9.10 Reporting and recordkeeping requirements.

8.9.10.1 Reporting.

8.9.10.1.1 You must report the following information for each monitoring location to the Division within 10 days of the end of any quarter in which monitoring is required:

8.9.10.1.1.1 Number of samples taken during the last quarter.

8.9.10.1.1.2 Date and results of each sample taken during the last quarter.

8.9.10.1.1.3 Arithmetic average of quarterly results for the last four quarters for each monitoring location (LRAA), beginning at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter. If the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters, you must report this information to the Division as part of the first report due following the compliance date or anytime thereafter that this determination is made. If you are required to conduct monitoring at a frequency that is less than quarterly, you must make compliance calculations beginning with the first compliance sample taken after the compliance date, unless you are required to conduct increased monitoring under subsection 8.9.6.

8.9.10.1.1.4 Whether, based on subsection 6.2.1.2 and this section, the MCL was violated at any monitoring location.

8.9.10.1.1.5 Any operational evaluation levels that were exceeded during the quarter and, if so, the location and date, and the calculated TTHM and HAA5 levels.

8.9.10.1.2 If you are a subpart H system seeking to qualify for or remain on reduced TTHM/HAA5 monitoring, you must report the following source water TOC information for each treatment plant that treats surface water or ground water under the direct influence of surface water to the Division within 10 days of the end of any quarter in which monitoring is required:

8.9.10.1.2.1 The number of source water TOC samples taken each month during last quarter.

8.9.10.1.2.2 The date and result of each sample taken during last quarter.

8.9.10.1.2.3 The quarterly average of monthly samples taken during last quarter or the result of the quarterly sample.

8.9.10.1.2.4 The running annual average (RAA) of quarterly averages from the past four quarters.

8.9.10.1.2.5 Whether the RAA exceeded 4.0 mg/L.

8.9.10.1.3 The Division may choose to perform calculations and determine whether the MCL was exceeded or the system is eligible for reduced monitoring in lieu of having the system report that information

8.9.10.2 Recordkeeping. You must retain any subsection 8.9 monitoring plans and your monitoring results under subsection 8.9 as required by subsection 4.4.

9.0 Radioactivity

9.1 Limits

9.1.1 Maximum Contaminant Levels for radionuclides:

9.1.1.1 [Reserved]

9.1.1.2 MCL for radium-226 and -228: The MCL for combined radium-226 and radium-228 is five (5) pCi/L. The combined radium-226 and radium-228 value is determined by the addition of the results of the analysis radium-226 and the analysis for radium-228.

9.1.1.3 MCL for gross alpha particle activity (excluding radon and uranium): The MCL for gross alpha particle activity (including radium-226 but excluding radon and uranium) is fifteen (15) pCi/L.

9.1.1.4 MCL for beta particle and photon radioactivity:

9.1.1.4.1 The average annual concentration of beta particle and photon radioactivity for man-made radionuclides in drinking water must not produce an annual dose equivalent to the total body or any internal organ greater than four (4) millirems per year.

9.1.1.4.2 Except for those listed in Table A below, the concentration of man-made radionuclides causing four (4) millirems total body or organ dose equivalents must be calculated on the basis of a two (2) liters per day drinking water intake using the 168 hour data listed in "Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure," NBS (National Bureau of Standards) Handbook 69 as amended August 1963, U.S. Department of Commerce. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 522(a) and 1 CFR part 51. Copies of this document are available from the National Technical Information Service, NTIS ADA 280 282, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-6847. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC. If two (2) or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed four (4) millirems per year.

Table A: Average Annual Concentrations Assumed to Produce a Total Body or Organ Dose of 4 Millirems/Year

Radionuclide	Critical Organ	pCi/L
Tritium	Total Body	20,000
Strontium	Bone Marrow	8

9.1.1.5 MCL for uranium: The MCL for uranium is 30 ug/L.

9.1.1.6 Compliance dates:

9.1.1.6.1 Compliance dates for the combined radium-226 and -228, gross alpha particle activity, gross beta particle and photon radioactivity, and uranium: Community water systems must comply with the MCLs listed subsections 9.1.1.2, 9.1.1.3, 9.1.1.4, and 9.1.1.5 beginning December 8, 2003 and compliance shall be determined in accordance with the requirements of sections 9.2.1 and 9.2.4. Compliance with reporting requirements for the radionuclides section 4.0 is required on December 8, 2003.

9.1.1.6.2 [Reserved]

9.1.1.7 Best Available Technologies (BATs) for radionuclides: The Administrator of the U.S. Environmental Protection Agency, pursuant to section 1412 of the Safe Drinking Water Act, hereby identifies as indicated in the following table the best technology available for achieving compliance with the MCLs for combined radium-226 and -228, uranium, gross alpha particle activity, and beta particle and photon radioactivity.

Table B: BAT for Combined Radium-226 and Radium-228, Uranium, Gross Alpha Particle Activity, and Beta Particle and Photon Radioactivity

Contaminant	**BAT**
Combined radium-226 and -228	Ion exchange, reverse osmosis, lime softening
Uranium	Ion exchange, reverse osmosis, lime softening, coagulation/ filtration
Gross alpha particle activity (excluding radon and uranium)	Reverse osmosis
Beta particle and photon radioactivity	Ion exchange, reverse osmosis

9.1.1.8 Small systems compliance technologies list for radionuclides.

Table C: List of Small Systems Compliance Technologies for Radionuclides and Limitations of Use

Unit Technologies	**Limitations (see footnotes)**	**Operator Skill Level Required**[1]	**Raw Water Quality Range and Considerations**
1. Ion Exchange (IE)	a	Intermediate	All ground waters
2. Point-of-Use (POU[2])IE	b	Basic	All ground waters
3. Reverse Osmosis (RO)	c	Advanced	Surface waters usually require pre-filtration
4. POU[2] RO	b	Basic	Surface waters usually require pre-filtration
5. Lime softening	d	Advanced	All waters
6. Greensand filtration	e	Basic	
7. Co-precipitation with barium sulfate	f	Intermediate to advanced	Ground waters with suitable water quality
8. Electrodialysis/ Electrodialysis reversal		Basic to intermediate	All ground waters
9. Pre-formed hydrous manganese oxide filtration	g	Intermediate	All ground waters
10. Activated alumina	a, h	Advanced	All ground waters; competing anion concentrations may affect regeneration frequency
11. Enhanced coagulation/ filtration	i	Advanced	Can treat a wide range of water qualities

1. National Research Council (NRC). Safe Water from Every Tap: Improving Water Service to Small Communities, National Academy Press, Washington, D.C., 1997.
2. A POU, or "point-of-use" technology, is a treatment device installed at a single tap used for the purpose of reducing contaminants in drinking water at the one tap. POU devices are typically installed at the kitchen tap.

Limitations Footnotes: Technologies for Radionuclides

a. The regeneration solution contains high concentrations of the contaminant ions. Disposal options should be carefully considered before choosing this technology.
b. When POU devices are used for compliance, programs for long-term operation, maintenance and monitoring must be provided by the water provider to ensure proper performance.
c. Reject water disposal options should be carefully considered before choosing this technology. See other RO limitations described Surface Water Rule Compliance Technologies Table.
d. The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small surface water systems.
e. Removal efficiencies can vary depending on water quality.
f. This technology may be very limited application to small systems. Since the process requires static mixing, detention basins, and filtration, it is most applicable to systems with sufficiently high sulfate levels that already have a suitable filtration treatment train in place.
g. This technology is most applicable to small systems that already have filtration in place.
h. Handling of chemicals required during regeneration and pH adjustment may be too difficult for small systems.
i. Assumes modification to a coagulation/filtration process already in place.

Table D: Compliance Technologies by System Size Category for Radionuclide National Primary Drinking Water Regulations (NPDWR's)

Contaminant	Compliance technologies[1] for system size categories (population served)		3,301-10,000
	25-500	501-3,300	
Combined radium-226 and radium-228	1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9
Gross alpha particle activity	3,4	3,4	3,4
Beta particle and photon radioactivity	1,2,3,4	1,2,3,4	1,2,3,4
Uranium	1,2,4,10,11	1,2,3,4,5,10,11	1,2,3,4,5,10,11

1. Numbers correspond to those technologies found listed in "Table C: List of Small Systems Compliance Technologies for Radionuclides and Limitations on Use"

9.2 Monitoring frequency and compliance requirements for radionuclides in community water systems.

9.2.1 Monitoring and compliance requirements for gross alpha particle activity, radium-226, radium-228, and uranium.

9.2.1.1 Community water systems (CWSs) must conduct initial monitoring to determine compliance with subsection 9.1 by December 31, 2007. For the purpose of monitoring for gross alpha particle activity, radium-226, radium-228, uranium, and beta particle and photon radioactivity in drinking water, "detection limit" is defined as in 40 CFR 141.25(c).

9.2.1.1.1 Applicability and sampling location for existing community water systems or sources. All existing CWSs using groundwater, surface water or systems using both ground and surface water (for the purpose of this section hereafter referred to as systems) must sample at every entry point to the distribution system that is representative of all sources being used (hereafter called a sample point) under normal operating conditions. The system must take each sample at the sampling point unless conditions make another sampling point more representative of each source or the Division has designated a distribution system location, in accordance with subsection 9.2.1.2.2.3.

9.2.1.1.2 Applicability and sampling location for new community water systems or sources. All CWSs or CWSs that use a new source of water must begin to conduct initial monitoring for the new source within the first quarter after initiating use of the source. CWSs must conduct more frequent monitoring when ordered by the Division in the event of possible contamination or when changes in the distribution system or treatment processes occur that may increase the concentration of radioactivity in finished water.

9.2.1.2 Initial monitoring: Systems must conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:

9.2.1.2.1 Systems without acceptable historical data, as defined below, must collect four consecutive quarterly samples at all sampling points before December 31, 2007.

9.2.1.2.2 Grandfathering of data: The Division may allow historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point, for the following situations.

9.2.1.2.2.1 To satisfy initial monitoring requirements, a community water system having only one entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

9.2.1.2.2.2 To satisfy initial monitoring requirements, a community water system with multiple entry points and having appropriate historical monitoring data for each entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

9.2.1.2.2.3 To satisfy initial monitoring requirements, a community water system with appropriate historical data for a representative point in the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003, provided that the Division finds that the historical data satisfactorily demonstrate that

each entry point to the distribution system is expected to be in compliance based upon the historical data and reasonable assumptions about the variability of contaminant levels between entry points. The Division must make a written finding indicating how the data conforms to these requirements.

9.2.1.2.3 For gross alpha particle activity, uranium, radium-226, and radium-228 monitoring, the Division may waive the final two quarters of initial monitoring for a sampling point if the results of the samples from the previous two quarters are below the detection limit.

9.2.1.2.4 If the average of the initial monitoring results for a sampling point is above the MCL, the system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Division.

9.2.1.3 Reduced monitoring: The Division may allow CWSs to reduce the future frequency of monitoring from once every three years to once every six or nine years at each sampling point, based on the following criteria.

9.2.1.3.1 If the average of the initial monitoring results for each contaminant (i.e., gross alpha particle activity, uranium, radium-226, or radium-228) is below the detection limit specified in subsection 9.2.4.3.1 Table A, the system must collect and analyze for that contaminant using at least one sample at that sampling point every nine years.

9.2.1.3.2 For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is at or above the detection limit but at or below ½ the MCL, the system must collect and analyze for that contaminant using at least one sample at that sampling point every six years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is at or above the detection limit but at or below ½ the MCL, the system must collect and analyze for that contaminant using at least one sample at that sampling point every six years.

9.2.1.3.3 For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above ½ the MCL but at or below the MCL, the system must collect and analyze at least one sample at that sampling point every three years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is above ½ the MCL but at or below the MCL, the system must collect and analyze at least one sample at that sampling point every three years.

9.2.1.3.4 Systems must use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods (e.g., if a system's sampling point is on a nine year monitoring period, and the sample result is above ½ the MCL, then the next monitoring period for that sampling point is three years).

9.2.1.3.5 If a system has a monitoring result that exceeds the MCL while on reduced monitoring, the system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Division.

9.2.1.4 Compositing: To fulfill quarterly monitoring requirements for gross alpha particle activity, radium-226, radium-228, or uranium, a system may composite up to four consecutive quarterly samples from a single entry point if analysis is done within a year of the first sample. The Division will treat analytical results from the composited as the average analytical result to determine compliance with the MCLs and the future monitoring frequency. If the analytical result from the composited sample is greater than ½ the MCL, the Division may direct the system to take additional quarterly samples before allowing the system to sample under a reduced monitoring schedule.

9.2.1.5 A gross alpha particle activity measurement may be substituted for the required radium-226 measurement provided that the measured gross alpha particle activity does not exceed 5 pCi/L. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/L. The gross alpha measurement shall have a confidence interval of 95% (1.65σ, where σ is the standard deviation of the net counting rate of the sample) for radium-226 and uranium. When a system uses a gross alpha particle activity measurement in lieu of radium-226 and/or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, ½ the detection limit will be used to determine compliance and the future monitoring frequency.

9.2.2 Monitoring and compliance requirements for beta particle and photon radioactivity. To determine compliance with the maximum contaminant levels in subsection 9.1.1.4 for beta particle and photon radioactivity, a system must monitor at a frequency as follows.

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

9.2.2.1.1 If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 50 pCi/L (screening level), the Division may reduce the frequency of monitoring at that sampling point to once every three years. Systems must collect all samples required in subsection 9.2.2.1 during the reduced monitoring period.

9.2.2.1.2 For systems in the vicinity of a nuclear facility, the Division may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Division determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems that are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with subsection 9.2.2.1.

9.2.2.2 Community water systems (both surface and ground water) designated by the Division as utilizing waters contaminated by effluents from nuclear facilities must sample for beta particle and photon radioactivity. Systems must collect quarterly samples for beta emitters and iodine-131 and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the Division. Systems already designated by the Division as systems using waters contaminated by effluents from nuclear facilities must continue to sample until the Division reviews and either reaffirms or removes the designation.

9.2.2.2.1 Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of three monthly samples. The former is recommended.

9.2.2.2.2 For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. As ordered by the Division, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water.

9.2.2.2.3 Annual monitoring for strontium-90 and tritium shall be conducted by means of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The latter procedure is recommended.

9.2.2.2.4 If the gross beta particle activity beta minus the naturally occurring potassium-40 beta particle at a sampling point has a running annual average (computed quarterly) less than or equal to 15 pCi/L, the Division may reduce the frequency of monitoring at that sampling point to every three years. Systems must collect all samples required in subsection 9.2.2.1 during the reduced monitoring period.

9.2.2.2.5 For systems in the vicinity of a nuclear facility, the Division may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Division determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems that are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with subsection 9.2.2.2.

9.2.2.3 Community water systems designated by the Division to monitor for beta particle and photon radioactivity can not apply to the Division for a waiver from the monitoring frequencies specified in subsections 9.2.2.1 or 9.2.2.2.

9.2.2.4 Community water systems may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. Systems are allowed to subtract the potassium-40 beta particle activity value from the total gross beta particle activity value to determine if the screening level is exceeded. The potassium-40 beta particle activity must be calculated by multiplying elemental potassium concentrations (in mg/L) by a factor of 0.82.

9.2.2.5 If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity exceeds the appropriate screening level, an analysis of the sample must be performed to identify the major radioactive constituents present in the sample and the appropriate doses must be calculated and summed to determine compliance with subsection 9.1.1, using the formula in subsection 9.1.1.4.2. Doses must also be calculated and combined for measured levels of tritium and strontium to determine compliance.

9.2.2.6 Systems must monitor monthly at the sampling point(s) that exceed the MCL in subsection 9.1.1 beginning the month after the exceedance occurs. Systems must continue monthly monitoring until the system has established, by a rolling average of three monthly samples, that the MCL is being met. Systems who establish that the MCL is being met must return to quarterly monitoring until they meet the requirements set forth in subsections 9.2.2.1.2 or 9.2.2.2.1.

9.2.3 General monitoring and compliance requirements for radionuclides.

9.2.3.1 The Division may require more frequent monitoring than specified in subsections 9.2.1 and 9.2.2, or may require confirmation samples at its discretion. The results of the initial and confirmation samples will be averaged for use in compliance determinations.

9.2.3.2 Each public water system shall monitor at the time designated by the Division during each compliance period.

9.2.3.3 Compliance: Compliance with subsection 9.1.1 will be determined based on the analytical result(s) obtained at each sampling point. If one sampling point is in violation of a MCL, the system is in violation of the MCL.

9.2.3.3.1 For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. If the average of any sampling point is greater than the MCL, then the system is out of compliance with the MCL.

9.2.3.3.2 For systems monitoring more than once per year, if any sample result will cause the running annual average to exceed the MCL at any sample point, the system is out of compliance with the MCL immediately.

9.2.3.3.3 Systems must include all samples taken and analyzed under the provisions of this section in determining compliance, even if that number is greater than the minimum required.

9.2.3.3.4 If a system does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance will be based on the running average of the samples collected.

9.2.3.3.5 If a sample result is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, ½ the detection limit will be used to calculate the annual average.

9.2.3.4 The Division has the discretion to delete results of obvious sampling or analytical errors.

9.2.3.5 If the MCL for radioactivity set forth in subsection 9.1.1 is exceeded, the operator of a community water system must give notice to the Division pursuant to subsection 4.1.2 and to the public as required in subsection 4.2.

9.2.4 Analytical Methodology:

9.2.4.1 The methods specified in 40 CFR 141.25(a), copies may be obtained from the Office of Drinking Water, are to be used to determine compliance with Section 9.0.

9.2.4.2 When the identification and measurement of radionuclides other than those listed in subsection 9.2.4.1 is required, the following references are to be used, except in cases where alternative methods have been approved in accordance with 40 CFR 141.27.

9.2.4.2.1 *Procedures for Radiochemical Analysis of Nuclear Reactor Aqueous Solutions*, H. L. Krieger and S. Gold, EPA-R4-73-014. USEPA, Cincinnati, Ohio, May 1973

9.2.4.2.2 *HASL Procedure Manual*, Edited by John H. Harley. HASL 300, ERDA Health and Safety Laboratory, New York, NY. 1973

9.2.4.3 For the purpose of monitoring radioactivity concentrations in drinking water, the required sensitivity of the radioanalysis is defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus one hundred (100) percent at the ninety-five (95) percent confidence level (1.96σ where σ is the standard deviation of the net counting rate of the sample).

9.2.4.3.1 To determine compliance with 9.1.1.2, 9.1.1.3, and 9.1.1.5 the detection limit shall not exceed the concentrations in Table A to this paragraph.

Table A. – Detection Limits for Gross Alpha Particle Activity, Radium 226, Radium 228, and Uranium

Contaminant	Detection Limit
Gross alpha particle activity……	3 pCi/L
Radium 226……	1 pCi/L
Radium 228……	1 pCi/L
Uranium……	1ug/L

9.2.4.3.2 To determine compliance with 9.1.1.4 the detection limits shall not exceed the concentrations listed in Table B to this paragraph.

Table B. – Detection Limits for Man-Made Beta Particle and Photon Emitters

Radionuclide	Detection Limit
Tritium……	1,000 pCi/L
Strontium-89……	10 pCi/L
Strontium-90……	2 pCi/L
Iodine-131……	1 pCi/L
Cesium-134……	10 pCi/L
Gross beta……	4 pCi/L
Other radionuclides……	1/10 of the applicable limit

9.2.4.4 To judge compliance with the maximum contaminant levels listed in 9.1.1.2 and 9.1.1.4 averages of the data shall be used and shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

9.2.4.5 The Division has the authority to determine compliance or initiate enforcement action based on analytical results or other information compiled by sanctioned representatives and agencies.

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

10.0 Surface Water Treatment Rule

10.1 Untreated Water: The use of untreated (without filtration and disinfection) surface water or untreated ground water under the direct influence of surface water shall be prohibited.

10.2 General Requirements: Each public water system with a surface water source or a ground water source under the direct influence of surface water must be operated by qualified personnel who meet the requirements of the Division and must provide treatment of that source water that complies with these treatment technique requirements. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

10.2.1 At least 99.9 percent (3-log) removal and/or inactivation of *Giardia lamblia* cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer; and

10.2.2 At least 99.99 percent (4-log) removal and/or inactivation of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

10.2.3 In addition to complying with the requirements in this section, systems serving fewer than 10,000 people must also comply with the requirements in subsection 10.13.

10.3 Disinfection: Each public water system with a surface water source or a ground water source under the direct influence of surface water must provide treatment consisting of both filtration as specified in subsection 10.4 and disinfection as follows:

10.3.1 The disinfection treatment must be sufficient to ensure that the total treatment processes of that system achieve at least 99.9 percent (3-log) inactivation and/or removal of *Giardia lamblia* cysts and at least 99.99 percent (4-log) inactivation and/or removal of viruses, as determined by the Division.

10.3.2 The residual disinfectant concentration in the water entering the distribution system, measured as specified in subsection 10.5 cannot be less than 0.3 mg/L for more than four (4) hours.

10.3.3 The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in subsection 10.5 cannot be undetectable, a chlorine residual of <0.04 mg/L is deemed to be undetectable, in more than five (5) percent of the samples each month, for any two (2) 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 five hundred (500) per milliliter, measured as heterotrophic plate count (HPC) as specified in subsection 10.6, 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 five (5) percent in one (1) month, for any two (2) consecutive months.

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

where:

a = number of instances where the residual disinfectant concentration is measured;

b = number of instances where the residual disinfectant concentration is not measured but HPC is measured;

c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d = number of instances where no residual disinfectant concentration is detected and where the HPC is >500/ml; and

e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

If the Division determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by an approved laboratory under the requisite time and temperature conditions specified in section 10.6, and that the system is providing adequate disinfection in the distribution system, the requirements of this Subsection do not apply.

10.4 Filtration: Each public water system with a surface water source or a ground water source under the direct influence of surface water must provide treatment consisting of both disinfection as specified in subsection 10.3 and filtration that complies with any one (1) of the following by June 29, 1993:

10.4.1 Conventional Filtration or Direct Filtration - For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered must be less than or equal to 0.5 NTU in at least ninety-five (95) percent of the measurements taken each month, measured as specified in subsection 10.6, except that if the Division determines that the system is capable of achieving at least 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts at some turbidity level higher than 0.5 NTU in at least ninety-five (95) percent of the measurements taken each month, the Division may substitute this higher turbidity limit for that system. However, in no case may the Division approve a turbidity limit that allows more than one (1) NTU in more than five (5) percent of the samples taken each month, measured as specified in subsection 10.6. The turbidity level of representative samples of a system's filtered water must at no time exceed five (5) NTU, measured as specified in subsection 10.6.

10.4.2 Slow Sand Filtration - For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to one (1) NTU in at least ninety-five (95) percent of the measurements taken each month, measured as specified in subsection 10.6, except that if the Division determines there is no significant interference with disinfection at a higher turbidity level, the Division may substitute the higher turbidity limit for that system.

10.4.3 Diatomaceous Earth Filtration - For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to one (1) NTU in at least ninety-five (95) percent of the measurements taken each month, measured as specified in subsection 10.6. The turbidity level of representative samples of a system's filtered water must at no time exceed five (5) NTU, measured as specified in subsection 10.6.

10.4.4 Other Filtration Technologies - A public water system may use a filtration technology not listed in this section if it demonstrates to the Division, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of subsection 10.3, consistently achieves 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts and 99.99 percent removal and/or inactivation of viruses. For a system that makes this demonstration, the requirements of subsection 10.4.2 apply. Beginning January 1, 2002 systems serving at least 10,000 people must meet the requirements for other filtration technologies in subsection 10.9.2. Beginning January 1, 2005 systems serving fewer than 10,000 people must meet the requirements for other filtration technologies in 40 CFR subpart T. Copies are available from the Office of Drinking Water.

10.4.5 Beginning January 1, 2005 systems serving fewer than 10,000 people must meet the turbidity requirements in 40 CFR subpart T. Copies are available from the Office of Drinking Water.

10.5 Monitoring Requirements: - A public water system that uses a surface water source or a ground water source under the direct influence of surface water must monitor in accordance with the following by June 29, 1993:

10.5.1 Turbidity measurements as required by subsection 10.4 must be performed on representative samples of the system's filtered water at least every four (4) hours that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the Division. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration or diatomaceous earth filtration, the Division may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. For systems serving five hundred (500) or fewer persons, the Division may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the Division determines that less frequent monitoring is sufficient to indicate effective filtration performance.

10.5.2 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 (4) hours may be conducted in lieu of continuous monitoring, but for no more than five (5) working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:

System Population	Samples/Day*
<500	1
501-1,000	2
1,001-2,500	3
2,501-3,300	4

*The day's samples cannot be taken at the same time. The sampling intervals are subject to Division review and approval. If at any time the residual disinfectant concentration falls below 0.3 mg/L in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every four (4) hours until the residual disinfectant concentration is equal to or greater than 0.3 mg/L.

10.5.3 The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in subsection 5.0, except that the Division may allow a public water system which uses both a surface water source or a ground water source under the direct influence of surface water, and a ground water source to take disinfectant residual samples at points other than the total coliform sampling points if the Division determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as HPC as specified in subsection 10.6, may be measured in lieu of residual disinfectant concentration. If the Division determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by an approved laboratory under the requisite time and temperature conditions specified in subsection 10.6 and that the system is providing adequate disinfection in the distribution system, the requirements of this Subsection do not apply.

10.6 Analytical Methodology - Only the analytical method(s) specified in this section, or otherwise approved by EPA, may be used to demonstrate compliance with subsections 10.2, 10.3 and 10.4. Measurement for pH, temperature, turbidity and residual disinfectant concentration must be conducted by a party approved by the Division. Measurements for total coliforms, fecal coliforms and HPC must be conducted by an approved laboratory. Until laboratory approval criteria are developed for the analysis of HPC and fecal coliforms, any

laboratory approved for total coliform analysis is deemed approved for HPC and fecal coliform analysis. The following procedures shall be performed in accordance with the publications listed in the following section. This incorporation by reference was approved by the Director of the Federal register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the methods published in Standard Methods published in Standard Methods for the Examination of Water and Wastewater may be obtained from the American Public Health Association et al. 1015 Fifteenth Street, NW., Washington, 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 Coliforms and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg et al), Applied and Environmental Microbiology, Volume 54, pp.1595-1601, June 1988 (as amended under Erratum, Applied and Environmental Microbiology, Volume 54, p. 3197, December 1988), may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Ave., 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 and Engineering, Pergammon Press Ltd., Fairview Park, Elmsford, New York 10523. Copies may be inspected at the U.S.E.P.A., Room EB15, 401 M Street SW., Washington, D.C. 20460 or at the Office of the Federal register, 1100 L Street, NW., Room 8401, Washington, D.C.

10.6.1 Total Coliform Concentration - See subsection 5.2.

10.6.2 Fecal Coliform Concentration - See subsection 5.2

10.6.3 Heterotrophic Plate Count - Method 907A (Pour Plate Method), pp. 864-866, as set forth in Standard Methods for the Examination of water and Wastewater, 1986, American Public Health Association et al., 16th edition.

10.6.4 Turbidity - See subsection 7.2.1

10.6.5 Residual Disinfectant Concentration - Residual disinfectant concentrations for free chlorine and combined chlorine (chloramines) must be measured by Method 408C (Amperometric Titration Method), pp. 303-306, Method 408D (DPD Ferrous Titrametric Method), pp. 306-309, Method 408E (DPD Colorimetric Method), pp. 309-310, or Method 408F (Leuco Crystal Violet Method), pp. 310-313, as set forth in Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., 16th edition. Residual disinfectant concentrations for free chlorine and combined chlorine may also be measured by using DPD colorimetric test kits if approved by the Division. Residual disinfectant concentration for ozone must be measured by the Indigo Method as set forth in Bader, H., Hoigne, J., "Determination of Ozone in Water by the Indigo Method; A submitted Standard Method"; Ozone Science and Engineering, Vol. 4 pp. 169-176, Pergammon Press Ltd., 1982, or automated methods which are calibrated in reference to the results obtained by the Indigo Method on a regular basis, if approved by the Division (NOTE - This method will be published in the 17th edition of Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., the Iodometric Method in the 16th edition may not be used). Residual disinfectant concentrations for chlorine dioxide must be measured by Method 410B (Amperometric Method) or Method 410C (DPD Method), pp. 322-324, as set forth in Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., 16th edition.

10.6.6 Temperature - Method 212 (Temperature), pp. 126-127, as set forth in Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., 16th edition.

10.6.7 pH - Method 423 (pH Value), pp. 429-437, as set forth in Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., 16th edition.

10.6.7.1 "Methods of Chemical analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268 (EPA-600/4-79-020), March 1985. Available from ORD Publications, CERI, EPA, Cincinnati, Ohio 45268

10.6.7.2 Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19013.

10.6.7.3 "Standard Methods for the Examination of Water and Wastewater," 16th Edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1985.

10.6.7.4 "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," Techniques of Water-Resources Investigations of the United States Geological Survey Books, Chapter A1, 1985, Open-File Report 85-495. Available from Open-File Services section, Western Distribution Branch, U.S. Geological Survey, MS 306 Box 24525, Denver Federal Center, Denver, Colorado 80225.

10.6.7.5 "Fluoride in Water and Wastewater. Industrial Method #129-71 W." Technicon Industrial Systems. Tarrytown, New York 10591, December 1972.

10.6.7.6 "Fluoride in Water and Wastewater," Technicon Industrial Systems. Tarrytown, New York 10591, February 1976.

10.6.7.7 "Orion Guide to Water and Wastewater Analysis." Form WeEEG/5880, p. 5, 1985. Orion Research, Inc, Cambridge, Maryland.

10.6.7.8 "Inductively Coupled Plasma Atomic Emission Analysis of Drinking Water," Appendix to Method 200.7, September 1985. U.S.E.P.A. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

10.6.7.9 The addition of 1 ml of 30% of H_2O_2 to each 100 ml of standards and samples is required before analysis.

10.6.7.10 Prior to dilution of the Arsenic and Selenium calibration standards, add 2 ml of 30% H_2O_2 for each 100 ml of standard.

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

10.7 General Requirements for the Interim Enhanced Surface Water Treatment Rule:

10.7.1 The requirements of this section constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required by subpart H systems. The requirements of this section are applicable to subpart H systems serving at least 10,000 people, beginning December 17, 2001 unless otherwise specified in this section. The regulations in this section establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: *Giardia lamblia*, viruses, heterotrophic plate count bacteria, Legionella, *Cryptosporidium*, and turbidity. Each subpart H system serving at least 10,000 people must provide treatment of its source water that complies with these treatment technique requirements and are in addition to those identified in subsection 10.2. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

10.7.1.1 At least 99 percent (2-log) removal of *Cryptosporidium* between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or *Cryptosporidium* control under the watershed control plan for unfiltered systems.

10.7.1.2 Compliance with the profiling and benchmark requirements under the provisions of subsection 10.8.

10.7.2 A public water system subject to the requirements of this section is considered to be in compliance with the requirements of subsection 10.7.1 if:

10.7.2.1 It meets the applicable filtration requirements in either subsections 10.4 or 10.9 and the disinfection requirements in subsections 10.3 and 10.8.

10.7.3 Systems are not permitted to begin construction of uncovered finished water storage facilities beginning February 16, 1999.

10.7.4 Subpart H systems that did not conduct optional monitoring under subsection 10.8 because they served fewer than 10,000 people when such monitoring was required, but serve more than 10,000 people prior to January 1, 2005 must comply with subsections 10.1, 10.7, 10.9, 10.10 and 10.11. These systems must also consult with the Division to establish a disinfection benchmark. A system that decides to make a significant change to its disinfection practice, as described in subsections 10.8.3.1.1 through 10.8.3.1.4 must consult with the Division prior to making such change.

10.8 Disinfection Profiling and Benchmarking.

10.8.1 Determination of systems required to profile. A public water system subject to the requirements of this section must determine its TTHM annual average using the procedure in subsection 10.8.1.1 and its HAA5 annual average using the procedure in subsection 10.8.1.2. The annual average is the arithmetic average of the quarterly averages of four consecutive quarters of monitoring.

10.8.1.1 The TTHM annual average must be the annual average during the same period as is used for the HAA5 annual average.

10.8.1.1.1 Those systems that collected data under the provisions of 61 FR 24368, May 14, 1996 must use the results of the samples collected during the last four quarters of required monitoring under the Information Collection Rule.

10.8.1.1.2 Those systems that use “grandfathered” HAA5 occurrence data that meet the provisions of subsection 10.8.1.2.2 must use TTHM data collected at the same time under the provisions of 40 CFR 141.12 and 141.30. Copies may be obtained from the Office of Drinking Water.

10.8.1.1.3 Those systems that use HAA5 occurrence data that meet the provisions of subsection 10.8.1.2.3.1 must use TTHM data collected at the same time under the provisions of 40 CFR 141.12 and 141.30. Copies may be obtained from the Office of Drinking Water.

10.8.1.2 The HAA5 annual average must be the annual average during the same period as is used for the TTHM annual average.

10.8.1.2.1 Those systems that collected data under the provisions of 61 FR 24368, May 14, 1996 must use the results of the samples collected during the last four quarters of required monitoring under the Information Collection Rule.

10.8.1.2.2 Those systems that have collected four quarters of HAA5 occurrence data that meets the routine monitoring sample number and location requirements for TTHM in 40 CFR 141.12 and 141.30 and handling and analytical method requirements of the Information Collection Rule may use those data to determine whether the requirements of this section apply. Copies may be obtained from the Office of Drinking Water.

10.8.1.2.3 Those systems that have not collected four quarters of HAA5 occurrence data that meets the provisions of either subsections 10.8.1.2.1 or 10.8.1.2.2 by March 16, 1999 must either:

10.8.1.2.3.1 Conduct monitoring for HAA5 that meets the routine monitoring sample number and location requirements for TTHM in 40 CFR 141.12 and 141.30 and handling and analytical method requirements of 61 FR 24368, May 14, 1996. Copies may be obtained from the Office of Drinking Water, to determine the HAA5 annual average and whether the requirements of subsection 10.8.2 apply. This monitoring must be completed so that the applicability determination can be made no later than March 16, 2000, or

10.8.1.2.3.2 Comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with subsection 10.8.2.

10.8.1.3 The system may request that the State approve a more representative annual data set than the data set determined under subsections 10.8.1.1 or 10.8.1.2 for the purpose of determining applicability of the requirements of this section.

10.8.1.4 The State may require that a system use a more representative annual data set than the data set determined under subsections 10.8.1.1 or 10.8.1.2 for the purpose of determining applicability of the requirements of this section.

10.8.1.5 The system must submit data to the State on the schedule in subsections 10.8.1.5.1 through 10.8.1.5.5.

10.8.1.5.1 Those systems that collected TTHM and HAA5 data under the provisions of 61 FR 2436, May 14, 1996, as required by subsections 10.8.1.1.1 and 10.8.1.2.1, must submit the results of the samples collected during the last 12 months of required monitoring under 61 FR 2436, May 14, 1996 not later than December 16, 1999. Copies may be obtained from the Office of Drinking Water.

10.8.1.5.2 Those systems that have collected four consecutive quarters of HAA5 occurrence data that meets the routine monitoring sample number and location for TTHM in 40 CFR 141.12 and 141.30 and handling and analytical method requirements 61 FR 2436, May 14, 1996, copies may be obtained from the Office of Drinking Water, as allowed by subsections 10.8.1.1.2 and 10.8.1.2.2, must submit those data to the State not later than April 16, 1999. Until the State has approved the data, the system must conduct monitoring for HAA5 using the monitoring requirements specified under subsection 10.8.1.2.3

10.8.1.5.3 Those systems that conduct monitoring for HAA5 using the monitoring requirements specified by subsections 10.8.1.1.3 and 10.8.1.2.3.1, must submit TTHM and HAA5 data not later than March 16, 2000.

10.8.1.5.4 Those systems that elect to comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with this section, as allowed under subsection 10.8.1.2.3.2, must notify the State in writing of their election not later than December 16, 1999.

10.8.1.5.5 If the system elects to request that the State approve a more representative annual data set than the data set determined under subsection 10.8.1.2.1, the system must submit this request in writing not later than December 16, 1999.

10.8.1.6 Any system having either a TTHM annual average >0.064 mg/L or an HAA5 annual average >0.048 mg/L during the period identified in subsections 10.8.1.1 and 10.8.1.2 must comply with subsection 10.8.2.

10.8.2 Disinfection profiling.

10.8.2.1 Any system that meets the criteria in subsection 10.8.1.6 must develop a disinfection profile of its disinfection practice for a period of up to three years.

10.8.2.2 The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the $CT_{99.9}$ values in Tables 1.1-1.6, 2.1, and 3.1 of 40 CFR 141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than March 16, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in subsections 10.8.2.2.1 through 10.8.2.2.4. A system with more than one point of disinfectant application must conduct the monitoring in subsections 10.8.2.2.1 through 10.8.2.2.4 for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in 40 CFR 141.74(a), copies may be obtained from the Office of Drinking Water, as follows:

10.8.2.2.1 The temperature of the disinfected water must be measured once per day at each residual disinfectant concentration sampling point during peak hourly flow.

10.8.2.2.2 If the system uses chlorine, the pH of the disinfected water must be measured once per day at each chlorine residual disinfectant concentration sampling point during peak hourly flow.

10.8.2.2.3 The disinfectant contact time(s) ("T") must be determined for each day during peak hourly flow.

10.8.2.2.4 The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection must be measured each day during peak hourly flow.

10.8.2.3 In lieu of the monitoring conducted under the provisions of subsection 10.8.2.2 to develop the disinfection profile, the system may elect to meet the requirements of subsection 10.8.2.3.1. In addition to the monitoring conducted under the provisions of subsection 10.8.2.2 to develop the disinfection profile, the system may elect to meet the requirements of subsection 10.8.2.3.2.

10.8.2.3.1 A PWS that has three years of existing operational data may submit those data, a profile generated using those data, and a request that the State approve use of those data in lieu of monitoring under the provisions of subsection 10.8.2.2 not later than March 16, 2000. The State must determine whether these operational data are substantially equivalent to data collected under the provisions of subsection 10.8.2.2. These data must also be representative of *Giardia lamblia* inactivation through the entire treatment plant and not just of certain treatment segments. Until the State approves this request, the system is required to conduct monitoring under the provisions of subsection 10.8.2.2.

10.8.2.3.2 In addition to the disinfection profile generated under subsection 10.8.2.2, a PWS that has existing operational data may use those data to develop a disinfection profile for additional years. Such systems may use these additional yearly disinfection profiles to develop a benchmark under the provisions of subsection 10.8.3. The State must determine whether these operational data are substantially equivalent to data collected under the provisions of subsection 10.8.2.2. These data must also be representative of inactivation through the entire treatment plant and not just of certain treatment segments.

10.8.2.4 The system must calculate the total inactivation ratio as follows:

10.8.2.4.1 If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio for the disinfection segment based on either of the methods in subsections 10.8.2.4.1.1 or 10.8.2.4.1.2.

10.8.2.4.1.1 Determine one inactivation ratio $CT_{calc}/CT_{99.9}$ before or at the first customer during peak hourly flow.

10.8.2.4.1.2 Determine successive $CT_{calc}/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining (CT_{calc}/CT99.9) for each sequence and then adding the ($CT_{calc}/CT_{99.9}$) values together to determine ($\sum(CT_{calc}/CT_{99.9})$).

10.8.2.4.2 If the system uses more than one point of disinfectant application before the first customer, the system must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The ($CT_{calc}/CT_{99.9}$) value of each segment and ($\sum(CT_{calc}/CT_{99.9})$) must be calculated using the method in subsection 10.8.2.4.1.

10.8.2.4.3 The system must determine the total logs of inactivation by multiplying the value calculated in subsection 10.8.2.4.1 or 10.8.2.4.2 by 3.0.

10.8.2.5 A system that uses either chloramines or ozone for primary disinfection must also calculate the logs of inactivation for viruses using a method approved by the State.

10.8.2.6 The system must retain disinfection profile data in graphic form, as a spreadsheet, or in some other format acceptable to the State for review as part of sanitary surveys conducted by the State.

10.8.3 Disinfection benchmarking.

10.8.3.1 Any system required to develop a disinfection profile under the provisions of subsections 10.8.1 and 10.8.2 and that decides to make a significant change to its disinfection practice must consult with the State prior to making such change. Significant changes to disinfection practice are:

10.8.3.1.1 Changes to the point of disinfection;

10.8.3.1.2 Changes to the disinfectant(s) used in the treatment plant;

10.8.3.1.3 Changes to the disinfection process; and

10.8.3.1.4 Any other modification identified by the State.

10.8.3.2 Any system that is modifying its disinfection practice must calculate its disinfection benchmark using the procedure specified in subsections 10.8.3.2.1 through 10.8.3.2.2.

10.8.3.2.1 For each year of profiling data collected and calculated under section 10.8.2, the system must determine the lowest average monthly *Giardia lamblia* inactivation in each year of profiling data. The system must determine the average *Giardia lamblia* inactivation for each calendar month for each year of profiling data by dividing the sum of daily *Giardia lamblia* of inactivation by the number of values calculated for that month.

10.8.3.2.2 The disinfection benchmark is the lowest monthly average value (for systems with one year of profiling data) or average of lowest monthly average values (for systems with more than one year of profiling data) of the monthly logs of *Giardia lamblia* inactivation in each year of profiling data.

10.8.3.2.3 A system that uses either chloramines or ozone for primary disinfection must also calculate the disinfection benchmark for viruses using a method approved by the State.

10.8.3.2.4 The system must submit information in subsections 10.8.3.4.1 through 10.8.3.4.4 to the State as part of its consultation process.

10.8.3.2.4.1 A description of the proposed change;

10.8.3.2.4.2 The disinfection profile for *Giardia lamblia* (and, if necessary, viruses) under section 10.8.2 and benchmark as required by subsection 10.8.3.2; and

10.8.3.2.4.3 An analysis of how the proposed change will affect the current levels of disinfection.

10.8.3.2.4.4 Any additional information requested by the Division.

10.9 Filtration Interim Enhanced Surface Water Treatment Rule: A public water system subject to the requirements of this section must provide treatment consisting of both disinfection, as specified in section 10.3, and filtration treatment which complies with the requirements of subsections 10.9.1 or 10.9.2 or section 10.4 by December 17, 2001.

10.9.1 Conventional filtration treatment or direct filtration.

10.9.1.1 For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month, measured as specified in 40 CFR 141.74(a) and (c).

10.9.1.2 The turbidity level of representative samples of a system's filtered water must at no time exceed 1 NTU, measured as specified in 40 CFR 141.74(a) and (c).

10.9.1.3 A system that uses lime softening may acidify representative samples prior to analysis using a protocol approved by the State.

10.9.2 Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in section 10.9.1 or in 40 CFR 141.73(b) or (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of subsection 10.3, consistently achieves 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of *Cryptosporidium* oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent

removal and/or inactivation of *Giardia lamblia* cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of *Cryptosporidium* oocysts.

10.10 Filtration sampling requirements:

10.10.1 Monitoring requirements for systems using filtration treatment. In addition to monitoring required by 40 CFR 141.74, a public water system subject to the requirements of this section that provides conventional filtration treatment or direct filtration must conduct continuous monitoring of turbidity for each individual filter using an approved method in 40 CFR 141.74(a) and must calibrate turbidimeters using the procedure specified by the manufacturer. Systems must record the results of individual filter monitoring every 15 minutes.

10.10.2 If there is a failure in the continuous turbidity monitoring equipment, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

10.11 Reporting and recordkeeping requirements: In addition to the reporting and recordkeeping requirements in 40 CFR 141.75, a public water system subject to the requirements of this section that provides conventional filtration treatment or direct filtration must report monthly to the State the information specified in subsections 10.11.1 and 10.11.2 beginning December 17, 2001. In addition to the reporting and recordkeeping requirements in 40 CFR 141.75, a public water system subject to the requirements of this section that provides filtration approved under subsection 10.9.2 must report monthly to the State the information specified in 10.11.1 beginning December 17, 2001. The reporting in subsection 10.11.1 is in lieu of the reporting specified in 40 CFR 141.75(b)(1).

10.11.1 Turbidity measurements as required by subsection 10.9 must be reported within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:

10.11.1.1 The total number of filtered water turbidity measurements taken during the month.

10.11.1.2 The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in subsections 10.9.1 or 10.9.2.

10.11.1.3 The date and value of any turbidity measurements taken during the month which exceed 1 NTU for systems using conventional filtration treatment or direct filtration, or which exceed the maximum level set by the State under subsection 10.9.2

10.11.2 Systems must maintain the results of individual filter monitoring taken under subsection 10.10 for at least three years. Systems must report that they have conducted individual filter turbidity monitoring under section 10.10 within 10 days after the end of each month the system serves water to the public. Systems must report individual filter turbidity measurement results taken under subsection 10.10 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in subsections 10.11.2.1 through 10.11.2.4. Systems that use lime softening may apply to the State for alternative exceedance levels for the levels specified in subsections 10.11.2.1 through 10.11.2.4 if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.

10.11.2.1 For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.

10.11.2.2 For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.

10.11.2.3 For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self-assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter

performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.

10.11.2.4 For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation (CPE), as defined in Section 1.0, by the State or a third party approved by the State no later than 30 days following the exceedance and have the evaluation completed and submitted to the State no later than 90 days following the exceedance. In consultation with the Division, the water supplier must implement any follow-up recommendations that result, as part of the CPE.

10.11.3 Additional reporting requirements:

10.11.3.1 If at any time the turbidity exceeds 1 NTU in representative samples of filtered water in a system using conventional filtration treatment or direct filtration, the system must inform the Division as soon as possible, but no later than the end of the next business day.

10.11.3.2 If at any time the turbidity in representative samples of filtered water exceeds the maximum level set by the Division under subsection 10.9.2 for filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, the system must inform the Division as soon as possible, but no later than the end of the next business day.

10.12 Recycle Provisions:

10.12.1 Applicability: All subpart H systems that employ conventional filtration or direct filtration treatment and that recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes must meet the requirements in subsections 10.12.2 through 10.12.4.

10.12.2 Reporting: A system must notify the Division in writing by December 8, 2003 if the system recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes. This notification must include, at a minimum, the information specified in subsections 10.12.2.1 and 10.12.2.2.

10.12.2.1 A plant schematic showing the origin of all flows that are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are reintroduced back into the treatment plant.

10.12.2.2 Typical recycle flow in gallons per minute (gpm), the highest observed plant flow experienced in the previous year (gpm), design flow for the treatment plant (gpm), and Division-approved operating capacity for the plant where the Division has made such a determination.

10.12.3 Treatment Technique Requirement: Any system that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes must return these flows through the processes of a system's existing conventional or direct filtration system as defined in Section 1.0 or at an alternate location approved by the Division by June 8, 2004. If capital improvements are required to modify the recycle location to meet this requirement, all capital improvements must be completed no later than June 8, 2006.

10.12.4 Recordkeeping: The system must collect and retain on file recycle flow information specified in subsections 10.12.4.1 through 10.12.4.6 for review and evaluation by the Division beginning June 8, 2004.

10.12.4.1 Copy of the recycle notification and information submitted to the Division under subsection 10.12.2.

10.12.4.2 List of all recycles flows and the frequency with which they are returned.

10.12.4.3 Average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes.

10.12.4.4 Typical filter run length and a written summary of how filter run length is determined.

10.12.4.5 The type of treatment provided for the recycle flow.

10.12.4.6 Data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used and average dose and frequency of use, and frequency at which solids are removed, if applicable.

10.13 General requirements for the Long Term 1 Enhanced Surface Water Treatment Rule.

10.13.1 Additional requirements for the systems serving fewer than 10,000 people. In addition to complying with the requirements of Section 10.0 of these regulations, systems using surface water or groundwater under the direct influence of surface water and serving fewer than 10,000 people must also comply with 40 CFR subpart T. Copies are available from the Office of Drinking Water.

10.14 Enhanced Treatment for *Cryptosporidium*

10.14.1 General requirements for the Long Term 2 Enhanced Surface Water Treatment Rule.

10.14.1.1 The requirements of subsection 10.14 are national primary drinking water regulations. The regulations in this section establish or extend treatment technique requirements in lieu of maximum contaminant levels for *Cryptosporidium*. These requirements are in addition to requirements for filtration and disinfection in subsections 10.0, 10.7, and 10.13 of these regulations.

10.14.1.2 Applicability. The requirements of this section apply to all subpart H systems, which are public water systems supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water.

10.14.1.2.1 Wholesale systems, as defined in Section 1.0, must comply with the requirements of this section based on the population of the largest system in the combined distribution system.

10.14.1.2.2 The requirements of this section for filtered systems apply to systems required by National Primary Drinking Water Regulations to provide filtration treatment, whether or not the system is currently operating a filtration system.

10.14.1.2.3 The requirements of this section for unfiltered systems apply only to unfiltered systems that timely met and continue to meet the filtration avoidance criteria in sections 10.0, 10.7, and 10.13 of this regulation, as applicable.

10.14.1.3 Requirements. Systems subject to this section must comply with the following requirements:

10.14.1.3.1 Systems must conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. This monitoring may include sampling for *Cryptosporidium*, E. coli, and turbidity as described in subsections 10.14.2 through 10.14.7, to determine what level, if any, of additional *Cryptosporidium* treatment they must provide.

10.14.1.3.2 Systems that plan to make a significant change to their disinfection practice must develop disinfection profiles and calculate disinfection benchmarks, as described in subsections 10.14.9 through 10.14.10.

10.14.1.3.3 Filtered systems must determine their *Cryptosporidium* treatment bin classification as described in subsection 10.14.11 and provide additional treatment for *Cryptosporidium*, if required, as described in subsection 10.14.12. All unfiltered systems must provide treatment for *Cryptosporidium* as described in subsection 10.14.13. Filtered and unfiltered systems must implement *Cryptosporidium* treatment according to the schedule in subsection 10.14.14.

10.14.1.3.4 Systems with uncovered finished water storage facilities must comply with the requirements to cover the facility or treat the discharge from the facility as described in subsection 10.14.15.

10.14.1.3.5 Systems required to provide additional treatment for *Cryptosporidium* must implement microbial toolbox options that are designed and operated as described in subsections 10.14.16 through 10.14.21.

10.14.1.3.6 Systems must comply with the applicable recordkeeping and reporting requirements described in subsections 10.14.22 through 10.14.23.

10.14.1.3.7 Systems must address significant deficiencies identified in sanitary surveys performed by EPA as described in subsection 10.14.24.

10.14.2 Source water monitoring.

10.14.2.1 Initial round of source water monitoring. Systems must conduct the following monitoring on the schedule in subsection 10.14.4 of this section unless they meet the monitoring exemption criteria in subsection 10.14.2.3.

10.14.2.1.1 Filtered systems serving at least 10,000 people must sample their source water for *Cryptosporidium*, E. coli, and turbidity at least monthly for 24 months.

10.14.2.1.2 Unfiltered systems serving at least 10,000 people must sample their source water for *Cryptosporidium* at least monthly for 24 months.

10.14.2.1.3 Filtered Systems

10.14.2.1.3.1 Filtered systems serving fewer than 10,000 people must sample their source water for E. coli at least once every two weeks for 12 months.

10.14.2.1.3.2 A filtered system serving fewer than 10,000 people may avoid E. coli monitoring if the system notifies the Division that it will monitor for *Cryptosporidium* as described in subsection 10.14.2.1.5. The system must notify the Division no later than 3 months prior to the date the system is otherwise required to start E. coli monitoring under subsection 10.14.2.3.

10.14.2.1.4 Filtered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months if they meet one of the following, based on monitoring conducted under 10.14.2.1.3.1:

10.14.2.1.4.1 For systems using lake/reservoir sources, the annual mean E. coli concentration is greater than 10 E. coli/100 mL.

10.14.2.1.4.2 For systems using flowing stream sources, the annual mean E. coli concentration is greater than 50 E. coli/100 mL.

10.14.2.1.4.3 The system does not conduct E. coli monitoring as described in subsection 10.14.2.1.3.1.

10.14.2.1.4.4 Systems using ground water under the direct influence of surface water (GWUDI) must comply with the requirements of subsection 10.14.2.1.4 based on the E. coli level that applies to the nearest surface water body. If no surface water body is nearby, the system must comply based on the requirements that apply to systems using lake/reservoir sources.

10.14.2.1.5 For filtered systems serving fewer than 10,000 people, the Division may approve monitoring for an indicator other than E. coli under subsections 10.14.2.1.3.1 and 10.14.2.1.3.2. The Division also may approve an alternative to the E. coli concentration in subsections 10.14.2.1.4.1, 10.14.2.1.4.2 or 10.14.2.1.4.4 of this section to trigger *Cryptosporidium* monitoring. This approval by the Division must be provided to the system in writing and must include the basis for the Division's determination that the alternative indicator and/or trigger level will provide a more accurate identification of whether a system will exceed the Bin 1 *Cryptosporidium* level in subsection 10.14.11.

10.14.2.1.6 Unfiltered systems serving fewer than 10,000 people must sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months.

10.14.2.1.7 Systems may sample more frequently than required under this section if the sampling frequency is evenly spaced throughout the monitoring period.

10.14.2.2 Second round of source water monitoring. Systems must conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in subsection 10.14.2.1, unless they meet the monitoring exemption criteria in subsection 10.14.2.4. Systems must conduct this monitoring on the schedule in subsection 10.14.2.3.

10.14.2.3 Monitoring schedule. Systems must begin the monitoring required in subsections 10.14.2.1 and 10.14.2.2 no later than the month beginning with the date listed in this table:

Source Water Monitoring Starting Dates Table

Systems that serve . . .	**Must begin the first round of source water monitoring no later than the month beginning...**	**And must begin the second round of source water monitoring no later than the month beginning ...**
At least 100,000 people	October 1, 2006	April 1, 2015
From 50,000 to 99,999 people	April 1, 2007	October 1, 2015
From 10,000 to 49,999 people	April 1, 2008	October 1, 2016
Fewer than 10,000 and monitor for E. coli[1]	October 1, 2008	October 1, 2017
Fewer than 10,000 and monitor for *Cryptosporidium*[2]	April 1, 2010	April 1, 2019

[1]Applies only to filtered systems.

[2]Applies to filtered systems that meet the conditions of subsection 10.14.2.1.4 unfiltered systems.

10.14.2.4 Monitoring avoidance.

10.14.2.4.1 Filtered systems are not required to conduct source water monitoring under this section if the system will provide a total of at least 5.5-log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of Bin 4 in subsection 10.14.12.

10.14.2.4.2 Unfiltered systems are not required to conduct source water monitoring under this section if the system will provide a total of at least 3-log *Cryptosporidium* inactivation, equivalent to meeting the treatment requirements for unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L in subsection 10.14.13.

10.14.2.4.3 If a system chooses to provide the level of treatment in subsections 10.14.2.4.1 or 10.14.2.4.2, as applicable, rather than start source water monitoring, the system must notify the Division in writing no later than the date the system is otherwise required to submit a sampling schedule for monitoring under subsection 10.14.3. Alternatively, a system may choose to stop sampling at any point after it has initiated monitoring if it notifies the Division in writing that it will provide this level of treatment. Systems must install and operate technologies to provide this level of treatment by the applicable treatment compliance date in subsection 10.14.14.

10.14.2.5 Plants operating only part of the year. Systems with subpart H plants that operate for only part of the year must conduct source water monitoring in accordance with this section, but with the following modifications:

10.14.2.5.1 Systems must sample their source water only during the months that the plant operates unless the Division specifies another monitoring period based on plant operating practices.

10.14.2.5.2 Systems with plants that operate less than six months per year and that monitor for *Cryptosporidium* must collect at least six *Cryptosporidium* samples per year during each of two years of monitoring. Samples must be evenly spaced throughout the period the plant operates.

10.14.2.6 New sources.

10.14.2.6.1 A system that begins using a new source of surface water or GWUDI after the system is required to begin monitoring under subsection 10.14.2.3 must monitor the new source on a schedule the Division approves. Source water monitoring must meet the requirements of this section. The system must also meet the bin classification and *Cryptosporidium* treatment requirements of subsections 10.14.11 and 10.14.12 or subsection 10.14.13, as applicable, for the new source on a schedule the Division approves.

10.14.2.6.2 The requirements of subsection 10.14.2.6 apply to subpart H systems that begin operation after the monitoring start date applicable to the system's size under subsection 10.14.2.3.

10.14.2.6.3 The system must begin a second round of source water monitoring no later than 6 years following initial bin classification under subsection 10.14.11 or determination of the mean *Cryptosporidium* level under subsection 10.14.13 as applicable.

10.14.2.7 Failure to collect any source water sample required under this section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory, and reporting requirements of subsections 10.14.3 through 10.14.7 is a monitoring violation.

10.14.2.8 Grandfathering monitoring data. Systems may use (grandfather) monitoring data collected prior to the applicable monitoring start date in subsection 10.14.2.3 to meet the initial source water monitoring requirements in subsection 10.14.2.1. Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this paragraph must meet the requirements in subsection 10.14.8.

10.14.3 Sampling schedules.

10.14.3.1 Systems required to conduct source water monitoring under subsection 10.14.2 must submit a sampling schedule that specifies the calendar dates when the system will collect each required sample.

10.14.3.1.1 Systems must submit sampling schedules no later than 3 months prior to the applicable date listed in subsection 10.14.2.3 for each round of required monitoring.

10.14.3.1.1.1 Systems serving at least 10,000 people must submit their sampling schedule for the initial round of source water monitoring under subsection 10.14.2.1 to EPA electronically at https://intranet.epa.gov/lt2/.

10.14.3.1.1.2 If a system is unable to submit the sampling schedule electronically, the system may use an alternative approach for submitting the sampling schedule that EPA approves.

10.14.3.1.2 Systems serving fewer than 10,000 people must submit their sampling schedules for the initial round of source water monitoring under subsection 10.14.2.1 to the Division.

10.14.3.1.3 Systems must submit sampling schedules for the second round of source water monitoring conducted under subsection 10.14.2.2 to the Division.

10.14.3.1.4 If EPA or the Division does not respond to a system regarding its sampling schedule, the system must sample at the reported schedule.

10.14.3.2 Systems must collect samples within two days before or two days after the dates indicated in their sampling schedule (i.e., within a five-day period around the schedule date) unless one of the conditions of subsections 10.14.3.2.1 or 10.14.3.2.2 applies.

10.14.3.2.1 If an extreme condition or situation exists that may pose danger to the sample collector, or that cannot be avoided and causes the system to be unable to sample in the scheduled five-day period, the system must sample as close to the scheduled date as is feasible unless the Division approves an alternative sampling date. The system must submit an explanation for the delayed sampling date to the Division concurrent with the shipment of the sample to the laboratory.

10.14.3.2.1.1 If a system is unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements in subsection 10.14.5, or the failure of an approved laboratory to analyze the sample, then the system must collect a replacement sample.

10.14.3.2.1.2 The system must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date unless the system demonstrates that collecting a replacement sample within this time frame is not feasible or the Division approves an alternative resampling date. The system must submit an explanation for the delayed sampling date to the Division concurrent with the shipment of the sample to the laboratory.

10.14.3.3 Systems that fail to meet the criteria of subsection 10.14.3.2 of this section for any source water sample required under subsection 10.14.2 must revise their sampling schedules to add dates for collecting all missed samples. Systems must submit the revised schedule to the Division for approval prior to when the system begins collecting the missed samples.

10.14.4 Sampling locations.

10.14.4.1 Systems required to conduct source water monitoring under subsection 10.14.2 must collect samples for each plant that treats a surface water or GWUDI source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the Division may approve one set of monitoring results to be used to satisfy the requirements of subsection 10.14.2 for all plants.

10.14.4.2 Source water samples

10.14.4.2.1 Systems must collect source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants, unless the system meets the condition of subsection 10.14.4.2.2.

10.14.4.2.2 The Division may approve a system to collect a source water sample after chemical treatment. To grant this approval, the Division must determine that collecting a sample prior to chemical treatment is not feasible for the system and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample.

10.14.4.3 Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition.

10.14.4.4 Bank filtration.

10.14.4.4.1 Systems that receive *Cryptosporidium* treatment credit for bank filtration under subsections 10.4.4 or 10.4.5, as applicable, must collect source water samples in the surface water prior to bank filtration.

10.14.4.4.2 Systems that use bank filtration as pretreatment to a filtration plant must collect source water samples from the well (i.e., after bank filtration). Use of bank filtration during monitoring must be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive treatment credit for the bank filtration under subsection 10.14.18.3.

10.14.4.5 Multiple sources. Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, must collect samples as specified in subsections 10.14.4.4.1 or 10.14.4.4.2. The use of multiple sources during monitoring must be consistent with routine operational practice.

10.14.4.5.1 If a sampling tap is available where the sources are combined prior to treatment, systems must collect samples from the tap.

10.14.4.5.2 If a sampling tap where the sources are combined prior to treatment is not available, systems must collect samples at each source near the intake on the same day and must follow either subsections 10.14.4.5.2.1 or 10.14.4.5.2.2 of this section for sample analysis.

10.14.4.5.2.1 Systems may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.

10.14.4.5.2.2 Systems may analyze samples from each source separately and calculate a weighted average of the analysis results for each sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source contributed to total plant flow at the time the sample was collected and then summing these values.

10.14.4.6 Additional Requirements. Systems must submit a description of their sampling location(s) to the Division at the same time as the sampling schedule required under subsection 10.14.3. This description must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle. If the Division does not respond to a system regarding sampling location(s), the system must sample at the reported location(s).

10.14.5 Analytical methods.

10.14.5.1 *Cryptosporidium*. Systems must analyze for *Cryptosporidium* using Method 1623: *Cryptosporidium* and Giardia in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-002 or Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-001, which are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods online from http://www.epa.gov/safewater/disinfection/lt2 or from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave., NW, Washington, DC 20460 (Telephone: 800-426-4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202-566-2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

10.14.5.1.1 Systems must analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in subsection 10.14.5.1. Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters approved by EPA for the methods listed in subsection 10.14.5.1, up to a packed pellet volume of at least 2 mL.

10.14.5.1.2 Matrix Spike samples

10.14.5.1.2.1 Matrix spike (MS) samples, as required by the methods in subsection 10.14.5.1, must be spiked and filtered by a laboratory approved for *Cryptosporidium* analysis under subsection 10.14.5.

10.14.5.1.2.2 If the volume of the MS sample is greater than 10 L, the system may filter all but 10 L of the MS sample in the field, and ship the filtered sample and the remaining 10 L of source water to the laboratory. In this case, the laboratory must spike the remaining 10 L of water and filter it through the filter used to collect the balance of the sample in the field.

10.14.5.1.3 Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery (OPR) samples.

10.14.5.2 E. coli. Systems must use methods for enumeration of E. coli in source water approved in subsection 10.14.5.2.

10.14.5.2.1 The time from sample collection to initiation of analysis may not exceed 30 hours unless the system meets the condition of subsection 10.14.5.2.2.

10.14.5.2.2 The Division may approve on a case-by-case basis the holding of an E. coli sample for up to 48 hours between sample collection and initiation of analysis if the Division determines that analyzing an E. coli sample within 30 hours is not feasible. E. coli samples held between 30 to 48 hours must be analyzed by the Colilert reagent version of Standard Method 9223B as listed in section 10.6 of this regulation.

10.14.5.2.3 Systems must maintain samples between 0^0C and 10^0C during storage and transit to the laboratory.

10.14.5.3 Turbidity. Systems must use methods for turbidity measurement approved in subsection 10.6.

10.14.6 Approved laboratories.

10.14.6.1 *Cryptosporidium*. Systems must have *Cryptosporidium* samples analyzed by a laboratory that is approved under EPA's Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water or a laboratory that has been certified for *Cryptosporidium* analysis by an equivalent Division laboratory certification program.

10.14.6.2 E. coli. Any laboratory certified by the EPA, the National Environmental Laboratory Accreditation Conference or the Division for total coliform or fecal coliform analysis under subsection 10.6 is approved for E. coli analysis under this section when the laboratory uses the same technique for E. coli that the laboratory uses for subsection 10.6.

10.14.6.3 Turbidity. Measurements of turbidity must be made by a party approved by the Division.

10.14.7 Reporting source water monitoring results.

10.14.7.1 Systems must report results from the source water monitoring required under subsection 10.14.2 no later than 10 days after the end of the first month following the month when the sample is collected.

10.14.7.2 Electronic Reporting

10.14.7.2.1 All systems serving at least 10,000 people must report the results from the initial source water monitoring required under subsection 10.14.2.1 to EPA electronically at https://intranet.epa.gov/lt2/.

10.14.7.2.2 If a system is unable to report monitoring results electronically, the system may use an alternative approach for reporting monitoring results that EPA approves.

10.14.7.3 Systems serving fewer than 10,000 people must report results from the initial source water monitoring required under subsection 10.14.2.1 to the Division.

10.14.7.4 All systems must report results from the second round of source water monitoring required under subsection 10.14.2.2 to the Division.

10.14.7.5 Systems must report the applicable information in subsections 10.14.7.5.1 and 10.14.7.5.2 for the source water monitoring required under subsection 10.14.2.

10.14.7.5.1 Systems must report the following data elements for each *Cryptosporidium* analysis:

Data element

PWS ID.

Facility ID.

Sample collection date.

Sample type (field or matrix spike).

Sample volume filtered (L), to nearest 1/4\ L.

Was 100% of filtered volume examined.

Number of oocysts counted.

10.14.7.5.1.1 For matrix spike samples, systems must also report the sample volume spiked and estimated number of oocysts spiked. These data are not required for field samples.

10.14.7.5.1.2 For samples in which less than 10 L is filtered or less than 100% of the sample volume is examined, systems must also report the number of filters used and the packed pellet volume.

10.14.7.5.1.3 For samples in which less than 100% of sample volume is examined, systems must also report the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.

10.14.7.5.2 Systems must report the following data elements for each E. coli analysis:

Data element

PWS ID.

Facility ID.

Sample collection date.

Analytical method number.

Method type.

Source type (flowing stream, lake/reservoir, GWUDI).

E. coli/100 mL.

Turbidity.[1]

[1] Systems serving fewer than 10,000 people that are not required to monitor for turbidity under subsection 10.14.2 are not required to report turbidity with their E. coli results.

10.14.8 Grandfathering previously collected data.

10.14.8.1 Grandfathering

10.14.8.1.1 Systems may comply with the initial source water monitoring requirements of subsection 10.14.2.1 by grandfathering sample results collected before the system is required to begin monitoring (i.e., previously collected data). To be grandfathered, the sample results and analysis must meet the criteria in this section and the Division must approve.

10.14.8.1.2 A filtered system may grandfather *Cryptosporidium* samples to meet the requirements of subsection 10.14.2.1 when the system does not have corresponding E. coli and turbidity samples. A system that grandfathers *Cryptosporidium* samples without E. coli and turbidity samples is not required to collect E. coli and turbidity samples when the system completes the requirements for *Cryptosporidium* monitoring under subsection 10.14.2.1.

10.14.8.2 E. coli sample analysis. The analysis of E. coli samples must meet the analytical method and approved laboratory requirements of subsections 10.14.5 through 10.14.6.

10.14.8.3 *Cryptosporidium* sample analysis. The analysis of *Cryptosporidium* samples must meet the criteria in this paragraph.

10.14.8.3.1 Laboratories analyzed *Cryptosporidium* samples using one of the analytical methods in subsections 10.14.8.3.1.1 through 10.14.8.3.1.6, which are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods on-line from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave, NW, Washington, DC 20460 (Telephone: 800-426-4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202-566-2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_ register/code--of--federal--regulations/ibr--locations.html.

10.14.8.3.1.1 Method 1623: *Cryptosporidium* and Giardia in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-002.

10.14.8.3.1.2 Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-001.

10.14.8.3.1.3 Method 1623: *Cryptosporidium* and Giardia in Water by Filtration/IMS/FA, 2001, United States Environmental Protection Agency, EPA-821-R-01-025.

10.14.8.3.1.4 Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA, 2001, United States Environmental Protection Agency, EPA-821--R-01-026.

10.14.8.3.1.5 Method 1623: *Cryptosporidium* and Giardia in Water by Filtration/IMS/FA, 1999, United States Environmental Protection Agency, EPA-821-R-99-006.

10.14.8.3.1.6 Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA, 1999, United States Environmental Protection Agency, EPA-821-R-99-001.

10.14.8.3.2 For each *Cryptosporidium* sample, the laboratory analyzed at least 10 L of sample or at least 2 mL of packed pellet or as much volume as could be filtered by 2 filters that EPA approved for the methods listed in subsection 10.14.8.3.1.

10.14.8.4 Sampling location. The sampling location must meet the conditions in subsection 10.14.4.

10.14.8.5 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 subsections 10.14.3.2.1 and 10.14.3.2.2 if the system provides documentation of the condition when reporting monitoring results.

10.14.8.5.1 The Division may approve grandfathering of previously collected data where there are time gaps in the sampling frequency if the system conducts additional monitoring the Division specifies to ensure that the data used to comply with the initial source water monitoring requirements of subsection 10.14.2.1 are seasonally representative and unbiased.

10.14.8.5.2 Systems may grandfather previously collected data where the sampling frequency within each month varied. If the *Cryptosporidium* sampling frequency varied, systems must follow the monthly averaging procedure in subsections 10.14.11.2.5 or 10.14.13.1.3, as applicable, when

calculating the bin classification for filtered systems or the mean *Cryptosporidium* concentration for unfiltered systems.

10.14.8.6 Reporting monitoring results for grandfathering. Systems that request to grandfather previously collected monitoring results must report the following information by the applicable dates listed in this paragraph. Systems serving at least 10,000 people must report this information to EPA unless the Division approves reporting to the Division rather than EPA. Systems serving fewer than 10,000 people must report this information to the Division.

10.14.8.6.1 Systems must report that they intend to submit previously collected monitoring results for grandfathering. This report must specify the number of previously collected results the system will submit, the dates of the first and last sample, and whether a system will conduct additional source water monitoring to meet the requirements of subsection 10.14.2.1. Systems must report this information no later than the date the sampling schedule under subsection 10.14.3 is required.

10.14.8.6.2 Systems must report previously collected monitoring results for grandfathering, along with the associated documentation listed in subsections 10.14.8.6.2.1 through 10.14.8.6.2.4, no later than two months after the applicable date listed in subsection 10.14.2.3.

10.14.8.6.2.1 For each sample result, systems must report the applicable data elements in subsection 10.14.8.

10.14.8.6.2.2 Systems must certify that the reported monitoring results include all results the system generated during the time period beginning with the first reported result and ending with the final reported result. This applies to samples that were collected from the sampling location specified for source water monitoring under this section, not spiked, and analyzed using the laboratory's routine process for the analytical methods listed in this section.

10.14.8.6.2.3 Systems must certify that the samples were representative of a plant's source water(s) and the source water(s) have not changed. Systems must report a description of the sampling location(s), which must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including points of chemical addition and filter backwash recycle.

10.14.8.6.2.4 For *Cryptosporidium* samples, the laboratory or laboratories that analyzed the samples must provide a letter certifying that the quality control criteria specified in the methods listed in subsection 10.14.8.3.1 were met for each sample batch associated with the reported results. Alternatively, the laboratory may provide bench sheets and sample examination report forms for each field, matrix spike, IPR, OPR, and method blank sample associated with the reported results.

10.14.8.7 If the Division determines that a previously collected data set submitted for grandfathering was generated during source water conditions that were not normal for the system, such as a drought, the Division may disapprove the data. Alternatively, the Division may approve the previously collected data if the system reports additional source water monitoring data, as determined by the Division, to ensure that the data set used under subsections 10.14.11 or 10.14.13 represents average source water conditions for the system.

10.14.8.8 If a system submits previously collected data that fully meet the number of samples required for initial source water monitoring under subsection 10.14.2.1 and some of the data are rejected due to not meeting the requirements of this section, systems must conduct additional monitoring to replace rejected data on a schedule the Division approves. Systems are not required to begin this additional monitoring until two months after notification that data have been rejected and additional monitoring is necessary.

10.14.9 Requirements when making a significant change in disinfection practice.

10.14.9.1 Following the completion of initial source water monitoring under subsection 10.14.2.1, a system that plans to make a significant change to its disinfection practice, as defined in subsection 10.14.9.2, must develop disinfection profiles and calculate disinfection benchmarks for *Giardia lamblia* and viruses as described in subsection 10.14.10. Prior to changing the disinfection practice, the system must notify the Division and must include in this notice the information in subsections 10.14.9.1.1 through 10.14.9.1.3.

10.14.9.1.1 A completed disinfection profile and disinfection benchmark for *Giardia lamblia* and viruses as described in subsection 10.14.10.

10.14.9.1.2 A description of the proposed change in disinfection practice.

10.14.9.1.3 An analysis of how the proposed change will affect the current level of disinfection.

10.14.9.2 Significant changes to disinfection practice are defined as follows:

10.14.9.2.1 Changes to the point of disinfection;

10.14.9.2.2 Changes to the disinfectant(s) used in the treatment plant;

10.14.9.2.3 Changes to the disinfection process; or

10.14.9.2.4 Any other modification identified by the Division as a significant change to disinfection practice.

10.14.10 Developing the disinfection profile and benchmark

10.14.10.1 Systems required to develop disinfection profiles under subsection 10.14.9 must follow the requirements of this section. Systems must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for *Giardia lamblia* and viruses. If systems monitor more frequently, the monitoring frequency must be evenly spaced. Systems that operate for fewer than 12 months per year must monitor weekly during the period of operation. Systems must determine log inactivation for *Giardia lamblia* through the entire plant, based on $CT_{99.9}$ values in Tables 1.1 through 1.6, 2.1 and 3.1 of CFR §141.74(b) as applicable. Copies are available from the Office of Drinking Water upon request Systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the Division.

10.14.10.2 Systems with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in subsections 10.14.10.2.1 through 10.14.10.2.4. Systems with more than one point of disinfectant application must conduct the monitoring in subsections 10.14.10.2.1 through 10.14.10.2.4 for each disinfection segment. Systems must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in subsection 10.6.

10.14.10.2.1 For systems using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the Division.

10.14.10.2.2 For systems using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the Division.

10.14.10.2.3 The disinfectant contact time(s)(t) must be determined during peak hourly flow.

10.14.10.2.4 The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfectant application must be measured during peak hourly flow.

10.14.10.3 In lieu of conducting new monitoring under subsection 10.14.10.2, systems may elect to meet the requirements of subsection 10.14.10.3.1 or 10.14.10.3.2 of this section.

10.14.10.3.1 Systems that have at least one year of existing data that are substantially equivalent to data collected under the provisions of section 10.14.10.2 may use these data to develop disinfection profiles as specified in this section if the system has neither made a significant change to its treatment practice nor changed sources since the data were collected. Systems may develop disinfection profiles using up to three years of existing data.

10.14.10.3.2 Systems may use disinfection profile(s) developed under subsection 10.8 or sections 10.8.1 through 10.8.1.6 in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Systems that have not developed a virus profile under subsection 10.8 or subsections 10.8.2 through 10.8.2.6 must develop a virus profile using the same monitoring data on which the *Giardia lamblia* profile is based.

10.14.10.4 Systems must calculate the total inactivation ratio for *Giardia lamblia* as specified in subsections 10.14.10.4.1 through 10.14.10.4.3.

10.14.10.4.1 Systems using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the methods in section 10.14.10.4.1.1 or 10.14.10.4.1.2.

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

10.14.10.4.1.2 Determine successive $CTcalc/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The system must calculate the total inactivation ratio by determining

~~(CTcalc/$CT_{99.9}$) for each sequence and then adding the (CTcalc/$CT_{99.9}$) values together to determine ($\sum$(CTcalc/$CT_{99.9}$)).~~

~~10.14.10.4.2 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 subsection 10.14.10.4.1.2.~~

~~10.14.10.4.3 The system must determine the total logs of inactivation by multiplying the value calculated in subsections 10.14.10.4.1 or 10.14.10.4.2 by Section 3.0.~~

~~10.14.10.4.4 Systems must calculate the log of inactivation for viruses using a protocol approved by the Division.~~

~~10.14.10.5 Systems must use the procedures specified in subsections 10.14.10.5.1 and 10.14.10.5.2 to calculate a disinfection benchmark.~~

~~10.14.10.5.1 For each year of profiling data collected and calculated under subsections 10.14.10.1 through 10.14.10.4, systems must determine the lowest mean monthly level of both *Giardia lamblia* and virus inactivation. Systems must determine the mean *Giardia lamblia* and virus inactivation for each calendar month for each year of profiling data by dividing the sum of daily or weekly *Giardia lamblia* and virus log inactivation by the number of values calculated for that month.~~

~~10.14.10.5.2 The disinfection benchmark is the lowest monthly mean value (for systems with one year of profiling data) or the mean of the lowest monthly mean values (for systems with more than one year of profiling data) of *Giardia lamblia* and virus log inactivation in each year of profiling data.~~

~~10.14.11 Bin classification for filtered systems~~

~~10.14.11.1 Following completion of the initial round of source water monitoring required under subsection 10.14.2.1, filtered systems must calculate an initial *Cryptosporidium* bin concentration for each plant for which monitoring was required. Calculation of the bin concentration must use the *Cryptosporidium* results reported under subsection 10.14.2.1 and must follow the procedures in subsections 10.14.11.2.1 through 10.14.11.2.5.~~

~~10.14.11.2 Bin classification~~

~~10.14.11.2.1 For systems that collect a total of at least 48 samples, the bin concentration is equal to the arithmetic mean of all sample concentrations.~~

~~10.14.11.2.2 For systems that collect a total of at least 24 samples, but not more than 47 samples, the bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.~~

~~10.14.11.2.3 For systems that serve fewer than 10,000 people and monitor for *Cryptosporidium* for only one year (i.e., collect 24 samples in 12 months), the bin concentration is equal to the arithmetic mean of all sample concentrations.~~

~~10.14.11.2.4 For systems with plants operating only part of the year that monitor fewer than 12 months per year under subsection 10.14.2.5, the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of *Cryptosporidium* monitoring.~~

~~10.14.11.2.5 If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in subsections 10.14.11.2.1 through 10.14.11.2.4.~~

~~10.14.11.3 Filtered systems must determine their initial bin classification from the following table and using the *Cryptosporidium* bin concentration calculated under subsections 10.14.11.1 and 10.14.11.2:~~

~~Bin Classification Table for Filtered Systems~~

~~For systems that are:~~	~~With a *Cryptosporidium* bin concentration of…[1]~~	~~The bin classification is…~~

...required to monitor for *Cryptosporidium* under subsection 10.14.2	*Cryptosporidium* <0.075 oocyst/L. 0.075 oocysts/L *Cryptosporidium* < 1.0 oocysts/L. 1.0 oocysts/L *Cryptosporidium* <3.0 oocysts/L *Cryptosporidium* >3.0 oocysts/L	Bin 1. Bin 2. Bin 3 Bin 4
...serving fewer than 10,000 people and NOT required to monitor for *Cryptosporidium* under subsection 10.14.2.1.4	N/A	Bin 1

[1] Based on calculations in subsection 10.14.11.1 or 10.14.11.4, as applicable.

10.14.11.4 Following completion of the second round of source water monitoring required under subsection 10.14.2.2, filtered systems must recalculate their *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under subsection 10.14.2.2 and following the procedures in subsections 10.14.11.2.1 through 10.14.11.2.4. Systems must then re-determine their bin classification using this bin concentration and the table in 10.14.11.3.

10.14.11.5 Reporting bin classification

10.14.11.5.1 Filtered systems must report their initial bin classification under subsection 10.14.11.3 to the Division for approval no later than 6 months after the system is required to complete initial source water monitoring based on the schedule in subsection 10.14.3.

10.14.11.5.2 Systems must report their bin classification under section 10.14.11.4 to the Division for approval no later than 6 months after the system is required to complete the second round of source water monitoring based on the schedule in subsection 10.14.2.3.

10.14.11.5.3 The bin classification report to the Division must include a summary of source water monitoring data and the calculation procedure used to determine bin classification.

10.14.11.6 Failure to comply with the conditions of subsection 10.14.11.5 is a violation of the treatment technique requirement.

10.14.12 Filtered system additional *Cryptosporidium* treatment requirements

10.14.12.1 Filtered systems must provide the level of additional treatment for *Cryptosporidium* specified in this paragraph based on their bin classification as determined under subsection 10.14.11 and according to the schedule in subsection 10.14.14.

If the system bin classification is…	**And the system uses the following filtration treatment in full compliance with sections 10.4 and 10.4.5 (as applicable), then the additional *Cryptosporidium* treatment requirements are…**			
	Conventional filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration	Alternative filtration technologies
Bin 1…	No additional treatment…	No additional treatment…	No additional treatment…	No additional Treatment
Bin 2…	1-log treatment…	1.5-log treatment…	1-log treatment…	([1])
Bin 3…	2-log treatment…	2.5-log treatment…	2-log treatment…	([2])

Bin 4…	2.5-log treatment…	3-log treatment…	2.5-log treatment…	([3])

[1] As determined by the Division such that the total *Cryptosporidium* removal and inactivation is at least 4.0-log.

[2] As determined by the Division such that the total *Cryptosporidium* removal and inactivation is at least 5.0-log.

[3] As determined by the Division such that the total *Cryptosporidium* removal and inactivation is at least 5.5-log.

10.14.12.2 Treatment options

10.14.12.2.1 Filtered systems must use one or more of the treatment and management options listed in subsection 10.14.16, termed the microbial toolbox, to comply with the additional *Cryptosporidium* treatment required in subsection 10.14.12.1.

10.14.12.2.2 Systems classified in Bin 3 and Bin 4 must achieve at least 1-log of the additional *Cryptosporidium* treatment required under subsection 10.14.12.1 using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or UV, as described in subsections 10.14.17 through 10.14.21.

10.14.12.3 Failure by a system in any month to achieve treatment credit by meeting criteria in sections 10.14.17 through 10.14.21 for microbial toolbox options that is at least equal to the level of treatment required in subsection 10.14.12.1 is a violation of the treatment technique requirement.

10.14.12.4 If the Division determines during a sanitary survey or an equivalent source water assessment that after a system completed the monitoring conducted under subsection 10.14.2.1 or subsection 10.14.2.2, significant changes occurred in the system's watershed that could lead to increased contamination of the source water by *Cryptosporidium*, the system must take actions specified by the Division to address the contamination. These actions may include additional source water monitoring and/or implementing microbial toolbox options listed in subsection 10.14.16.

10.14.13 Unfiltered system *Cryptosporidium* treatment requirements

10.14.13.1 Determination of mean *Cryptosporidium* level.

10.14.13.1.1 Following completion of the initial source water monitoring required under subsection 10.14.2.1, unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under subsection 10.14.2.1. Systems must report this value to the Division for approval no later than 6 months after the month the system is required to complete initial source water monitoring based on the schedule in subsection 10.14.2.3.

10.14.13.1.2 Following completion of the second round of source water monitoring required under subsection 10.14.2.2, unfiltered systems must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under section 10.14.2.2. Systems must report this value to the Division for approval no later than 6 months after the month the system is required to complete the second round of source water monitoring based on the schedule in subsection 10.14.1.3.

10.14.13.1.3 If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the calculation of the mean *Cryptosporidium* level in subsections 10.14.13.1.1 or 10.14.13.1.2.

10.14.13.1.4 The report to the Division of the mean *Cryptosporidium* levels calculated under subsections 10.14.13.1.1 and 10.14.13.1.2 must include a summary of the source water monitoring data used for the calculation.

10.14.13.1.5 Failure to comply with the conditions of subsection 10.14.13.1 is a violation of the treatment technique requirement.

10.14.13.2 *Cryptosporidium* inactivation requirements. Unfiltered systems must provide the level of inactivation for *Cryptosporidium* specified in this paragraph, based on their mean *Cryptosporidium* levels as determined under subsection 10.14.13.1 and according to the schedule in subsection 10.14.14.

10.14.13.2.1 Unfiltered systems with a mean *Cryptosporidium* level of 0.01 oocysts/L or less must provide at least 2-log *Cryptosporidium* inactivation.

10.14.13.2.2 Unfiltered systems with a mean *Cryptosporidium* level of greater than 0.01 oocysts/L must provide at least 3-log *Cryptosporidium* inactivation.

10.14.13.3 Inactivation treatment technology requirements. Unfiltered systems must use chlorine dioxide, ozone, or UV as described in subsection 10.14.21 to meet the *Cryptosporidium* inactivation requirements of this section.

10.14.13.3.1 Systems that use chlorine dioxide or ozone and fail to achieve the *Cryptosporidium* inactivation required in subsection 10.14.13.2 on more than one day in the calendar month are in violation of the treatment technique requirement.

10.14.13.3.2 Systems that use UV light and fail to achieve the *Cryptosporidium* inactivation required in subsection 10.14.13.2 by meeting the criteria in subsection 10.14.21.4.2 are in violation of the treatment technique requirement.

10.14.13.4 Use of two disinfectants. Unfiltered systems must meet the combined *Cryptosporidium* inactivation requirements of this section and *Giardia lamblia* and virus inactivation requirements of subsection 10.3 using a minimum of two disinfectants, and each of two disinfectants must separately achieve the total inactivation required for either *Cryptosporidium*, *Giardia lamblia*, or viruses. Note: these regulations prohibit unfiltered surface water systems.

10.14.14 Schedule for compliance with *Cryptosporidium* treatment requirements

10.14.14.1 Following initial bin classification under subsection 10.14.11.3, filtered systems must provide the level of treatment for *Cryptosporidium* required under subsection 10.14.12 according to the schedule in subsection 10.14.14.3.

10.14.14.2 Following initial determination of the mean *Cryptosporidium* level under subsection 10.14.13.1.1, unfiltered systems must provide the level of treatment for *Cryptosporidium* required under section 10.14.13 according to the schedule in subsection 10.14.14.3.

10.14.14.3 *Cryptosporidium* treatment compliance dates.

Cryptosporidium Treatment Compliance Dates Table

Systems that serve…	**Must comply with *Cryptosporidium* treatment requirements no later than…**[1]
(1) at least 100,000 people	(i) April 1, 2012
(2) From 50,000 to 99,999 people	(i) October 1, 2012
(3) From 10,000 to 49,999 people	(i) October 1, 2013
(4) Fewer than 10,000 people	(i) October 1, 2014

[1] The Division may allow up to an additional two years for complying with the treatment requirement for systems making capital improvements.

10.14.14.4 If the bin classification for a filtered system changes following the second round of source water monitoring, as determined under subsection 10.14.11.4, the system must provide the level of treatment for *Cryptosporidium* required under subsection 10.14.12 on a schedule the Division approves.

10.14.14.5 If the mean *Cryptosporidium* level for an unfiltered system changes following the second round of monitoring, as determined under subsection 10.14.13.1.2, and if the system must provide a different level of *Cryptosporidium* treatment under subsection 10.14.13 due to this change, the system must meet this treatment requirement on a schedule the Division approves.

10.14.15 Requirements for uncovered finished water storage facilities

10.14.15.1 Systems using uncovered finished water storage facilities must comply with the conditions of this section.

10.14.15.2 Systems must notify the Division of the use of each uncovered finished water storage facility no later than April 1, 2008.

10.14.15.3 Systems must meet the conditions of subsections 10.14.15.3.1 or 10.14.15.3.2 for each uncovered finished water storage facility or be in compliance with a Division-approved schedule to meet these conditions no later than April 1, 2009.

10.14.15.3.1 Systems must cover any uncovered finished water storage facility.

10.14.15.3.2 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 Division.

10.14.15.4 Failure to comply with the requirements of this section is a violation of the treatment technique requirement.

10.14.16 Microbial toolbox options for meeting *Cryptosporidium* treatment requirements.

10.14.16.1 Treatment credits

10.14.16.1.1 Systems receive the treatment credits listed in the table in subsection 10.14.16.2 by meeting the conditions for microbial toolbox options described in subsections 10.14.17 through 10.14.21. Systems apply these treatment credits to meet the treatment requirements in subsections 10.14.12 or 10.14.13, as applicable.

10.14.16.1.2 Unfiltered systems are eligible for treatment credits for the microbial toolbox options described in subsection 10.14.21 only.

10.14.16.2 The following table summarizes options, treatment credits, and criteria in the microbial toolbox:

Microbial Toolbox Summary Table: Options, Treatment Credits and Criteria

Toolbox Option	***Cryptosporidium* Treatment credit with design and implementation criteria**
Source Protection and Management Toolbox Options	
(1) Watershed control program	0.5-log credit for Division-approved program comprising required elements, annual program status report to Division, and regular watershed survey. Unfiltered systems are not eligible for credit. Specific criteria are in subsection 10.14.17.1.
(2) Alternative source/intake management	No prescribed credit. Systems may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria are in 10.14.17.2.
Pre-Filtration Toolbox Options	
(3) Presedimentation basin with coagulation	0.5-log credit during any month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative Division-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through the basins. Specific criteria are in subsection 10.14.18.1.
(4) Two-stage lime softening	0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow must pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria are in subsection 10.14.18.2.
(5) Bank filtration	0.5-log credit for 25 foot setback; 1.0-log credit for 50 foot setback; aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU. Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit. Specific criteria are in subsection 10.14.18.3.
Treatment Performance Toolbox Options	
(6) Combined filter performance	0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria are in subsection 10.14.19.1.

(7) Individual filter performance	0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria are in subsection 10.14.19.2.
(8) Demonstration of performance	Credit awarded to unit process or treatment train based on a demonstration to the Division with a Division-approved protocol. Specific criteria are in subsection 10.14.19.3.
Additional Filtration Toolbox Options	
(9) Bag or cartridge filters (individual filters)	Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1-log factor of safety. Specific criteria are in subsection 10.14.20.1.
(10) Bag or cartridge filter (in series)	Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria are in subsection 10.14.20.1.
(11) Membrane filtration	Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria are in subsection 10.14.20.2.
(12) Second stage filtration	0.5-log credit for second separate granular media filtration stage if treatment rain includes coagulation prior to first filter. Specific criteria are in subsection 10.14.20.3.
(13) Slow sand filters	2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria are in subsection 10.14.20.4.
Inactivation Toolbox Options	
(14) Chlorine dioxide	Log credit based on measured CT in relation to CT table. Specific criteria are in subsection 10.14.21.2.
(15) Ozone	Log credit based on measured CT in relation to CT table. Specific criteria are in subsection 10.14.21.2.
(16) UV	Log credit based on validated UV dose in relation to UV dose table; reactor validation testing required to establish UV dose and associated operating conditions. Specific criteria are in subsection 10.14.21.4.

10.14.17 Source toolbox components

10.14.17.1 Watershed control program. Systems receive 0.5-log *Cryptosporidium* treatment credit for implementing a watershed control program that meets the requirements of this section.

10.14.17.1.1 Systems that intend to apply for the watershed control program credit must notify the Division of this intent no later than two years prior to the treatment compliance date applicable to the system in subsection 10.14.14.

10.14.17.1.2 Systems must submit to the Division a proposed watershed control plan no later than one year before the applicable treatment compliance date in subsection 10.14.14. The Division must approve the watershed control plan for the system to receive watershed control program treatment credit. The watershed control plan must include the elements in subsections 10.14.17.1.2.1 through 10.14.17.1.2.4.

10.14.17.1.2.1 Identification of an "area of influence" outside of which the likelihood of *Cryptosporidium* or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys under section 10.14.17.1.5.2.

10.14.17.1.2.2 Identification of both potential and actual sources of *Cryptosporidium* contamination and an assessment of the relative impact of these sources on the system's source water quality.

10.14.17.1.2.3 An analysis of the effectiveness and feasibility of control measures that could reduce *Cryptosporidium* loading from sources of contamination to the system's source water.

10.14.17.1.2.4 A statement of goals and specific actions the system will undertake to reduce source water *Cryptosporidium* levels. The plan must explain how the actions are expected to contribute to specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.

10.14.17.1.3 Systems with existing watershed control programs (i.e., programs in place on January 5, 2006) are eligible to seek this credit. Their watershed control plans must meet the criteria in subsection 10.14.17.1.2 and must specify ongoing and future actions that will reduce source water *Cryptosporidium* levels.

10.14.17.1.4 If the Division does not respond to a system regarding approval of a watershed control plan submitted under this section and the system meets the other requirements of this section, the watershed control program will be considered approved and 0.5 log *Cryptosporidium* treatment credit will be awarded unless and until the Division subsequently withdraws such approval.

10.14.17.1.5 Systems must complete the actions in subsections 10.14.17.1.5.1 through 10.14.17.1.5.3 to maintain the 0.5-log credit.

10.14.17.1.5.1 Submit an annual watershed control program status report to the Division. The annual watershed control program status report must describe the system's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the Division or as the result of the watershed survey conducted under subsection 10.14.17.1.5.2. It must also describe any significant changes that have occurred in the watershed since the last watershed sanitary survey. If a system determines during implementation that making a significant change to its approved watershed control program is necessary, the system must notify the Division prior to making any such changes. If any change is likely to reduce the level of source water protection, the system must also list in its notification the actions the system will take to mitigate this effect.

10.14.17.1.5.2 Undergo a watershed sanitary survey every three years for community water systems and every five years for noncommunity water systems and submit the survey report to the Division. The survey must be conducted according to Division guidelines and by persons the Division approves.

10.14.17.1.5.2.1 The watershed sanitary survey must meet the following criteria: encompass the region identified in the Division-approved watershed control plan as the area of influence; assess the implementation of actions to reduce source water *Cryptosporidium* levels; and identify any significant new sources of *Cryptosporidium*.

10.14.17.1.5.2.2 If the Division determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, systems must undergo another watershed sanitary survey by a date the Division requires, which may be earlier than the regular date in subsection 10.14.17.1.5.2.

10.14.17.1.5.3 The system must make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon request. These documents must be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The Division may approve systems to withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.

10.14.17.1.6 If the Division determines that a system is not carrying out the approved watershed control plan, the Division may withdraw the watershed control program treatment credit.

10.14.17.2 Alternative source.

10.14.17.2.1 A system may conduct source water monitoring that reflects a different intake location (either in the same source or for an alternate source) or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the Division approves, a system may determine its bin classification under subsection 10.14.11 based on the alternative source monitoring results.

10.14.17.2.2 If systems conduct alternative source monitoring under subsection 10.14.17.2.1, systems must also monitor their current plant intake concurrently as described in subsection 10.14.2.

10.14.17.2.3 Alternative source monitoring under subsection 10.14.17.2.1 must meet the requirements for source monitoring to determine bin classification, as described in subsections 10.14.2 through 10.14.7. Systems must report the alternative source monitoring results to the Division,

along with supporting information documenting the operating conditions under which the samples were collected.

10.14.17.2.4 If a system determines its bin classification under subsection 10.14.11 using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the system must relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in subsection 10.14.14.

10.14.18 Pre-filtration treatment toolbox components

10.14.18.1 Presedimentation. Systems receive 0.5-log *Cryptosporidium* treatment credit for a presedimentation basin during any month the process meets the criteria in this paragraph.

10.14.18.1.1 The presedimentation basin must be in continuous operation and must treat the entire plant flow taken from a surface water or GWUDI source.

10.14.18.1.2 The system must continuously add a coagulant to the presedimentation basin.

10.14.18.1.3 The presedimentation basin must achieve the performance criteria in subsections 10.14.18.1.3.1 or 10.14.18.1.3.2.

10.14.18.1.3.1 Demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent and must be calculated as follows: $\log_{10}$(monthly mean of daily influent turbidity) - $\log_{10}$(monthly mean of daily effluent turbidity).

10.14.18.1.3.2 Complies with Division-approved performance criteria that demonstrate at least 0.5-log mean removal of micron-sized particulate material through the presedimentation process.

10.14.18.2 Two-stage lime softening. Systems receive an additional 0.5-log *Cryptosporidium* treatment credit for a two-stage lime softening plant if chemical addition and hardness precipitation occur in two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or GWUDI source.

10.14.18.3 Bank filtration. Systems receive *Cryptosporidium* treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this paragraph. Systems using bank filtration when they begin source water monitoring under subsection 10.14.2.1 must collect samples as described in subsection 10.14.4.4 and are not eligible for this credit.

10.14.18.3.1 Wells with a ground water flow path of at least 25 feet receive 0.5-log treatment credit; wells with a ground water flow path of at least 50 feet receive 1.0-log treatment credit. The ground water flow path must be determined as specified in subsection 10.14.18.3.4.

10.14.18.3.2 Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. A system must characterize the aquifer at the well site to determine aquifer properties. Systems must extract a core from the aquifer and demonstrate that in at least 90 percent of the core length, grains less than 1.0 mm in diameter constitute at least 10 percent of the core material.

10.14.18.3.3 Only horizontal and vertical wells are eligible for treatment credit.

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

10.14.18.3.5 Systems must monitor each wellhead for turbidity at least once every four hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the system must report this result to the Division and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the Division determines that microbial removal has been compromised, the Division may revoke treatment credit until the system implements corrective actions approved by the Division to remediate the problem.

10.14.18.3.6 Springs and infiltration galleries are not eligible for treatment credit under this section, but are eligible for credit under subsection 10.14.19.3.

10.14.18.3.7 Bank filtration demonstration of performance. The Division may approve *Cryptosporidium* treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than 1.0-log and may be

awarded to bank filtration that does not meet the criteria in subsections 10.14.18.3.1 through 10.14.18.3.5.

10.14.18.3.7.1 The study must follow a Division-approved protocol and must involve the collection of data on the removal of *Cryptosporidium* or a surrogate for *Cryptosporidium* and related hydrogeologic and water quality parameters during the full range of operating conditions.

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

10.14.19 Treatment performance toolbox components

10.14.19.1 Combined filter performance. Systems using conventional filtration treatment or direct filtration treatment receive an additional 0.5-log *Cryptosporidium* treatment credit during any month the system meets the criteria in this paragraph. Combined filter effluent (CFE) turbidity must be less than or equal to 0.15 NTU in at least 95 percent of the measurements. Turbidity must be measured as described in subsections 10.5.1 and 7.1.2.

10.14.19.2 Individual filter performance. Systems using conventional filtration treatment or direct filtration treatment receive 0.5-log *Cryptosporidium* treatment credit, which can be in addition to the 0.5-log credit under subsection 10.14.19.1, during any month the system meets the criteria in this paragraph. Compliance with these criteria must be based on individual filter turbidity monitoring as described in section 10.10 or CFR section 141.560 (Copy available at the Office of Drinking Water as applicable).

10.14.19.2.1 The filtered water turbidity for each individual filter must be less than or equal to 0.15 NTU in at least 95 percent of the measurements recorded each month.

10.14.19.2.2 No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.

10.14.19.2.3 Any system that has received treatment credit for individual filter performance and fails to meet the requirements of subsections 10.14.19.2.1 or 10.14.19.2.2 during any month does not receive a treatment technique violation under subsection 10.14.12.3 if the Division determines the following:

10.14.19.2.3.1 The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance.

10.14.19.2.3.2 The system has experienced no more than two such failures in any calendar year.

10.14.19.3 Demonstration of performance. The Division may approve *Cryptosporidium* treatment credit for drinking water treatment processes based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than or less than the prescribed treatment credits in subsection 10.14.12 or subsections 10.14.18 through 10.14.21 and may be awarded to treatment processes that do not meet the criteria for the prescribed credits.

10.14.19.3.1 Systems cannot receive the prescribed treatment credit for any toolbox box option in subsections 10.14.18 through 10.14.21 if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under this paragraph.

10.14.19.3.2 The demonstration of performance study must follow a Division-approved protocol and must demonstrate the level of *Cryptosporidium* reduction the treatment process will achieve under the full range of expected operating conditions for the system.

10.14.19.3.3 Approval by the Division must be in writing and may include monitoring and treatment performance criteria that the system must demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The Division may designate such criteria where necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

10.14.20 Additional filtration toolbox components

10.14.20.1 Bag and cartridge filters. Systems receive *Cryptosporidium* treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series by meeting the criteria in subsections 10.14.20.1.1 through 10.14.20.1.10. To be eligible for this credit, systems must report the results of challenge testing that meets the requirements of subsections 10.14.20.1.2 through 10.14.20.1.9 to the Division. The filters must treat the entire plant flow taken from a subpart H source.

10.14.20.1.1 The *Cryptosporidium* treatment credit awarded to bag or cartridge filters must be based on the removal efficiency demonstrated during challenge testing that is conducted according to

the criteria in subsections 10.14.20.1.2 through 10.14.20.1.9. A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series must be applied to challenge testing results to determine removal credit. Systems may use results from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria specified in sections 10.14.20.1.2 through 10.14.20.1.9.

10.14.20.1.2 Challenge testing must be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the system will use for removal of *Cryptosporidium*. Bag or cartridge filters must be challenge tested in the same configuration that the system will use, either as individual filters or as a series configuration of filters.

10.14.20.1.3 Challenge testing must be conducted using *Cryptosporidium* or a surrogate that is removed no more efficiently than *Cryptosporidium*. The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discreetly quantifying the specific microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.

10.14.20.1.4 The maximum feed water concentration that can be used during a challenge test must be based on the detection limit of the challenge particulate in the filtrate (i.e., filtrate detection limit) and must be calculated using the following equation:

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

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

10.14.20.1.6 Each filter evaluated must be tested for a duration sufficient to reach 100 percent of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of this section.

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

$$LRV = LOG_{10}(C_f) - LOG_{10}(C_p)$$

Where:

LRV = log removal value demonstrated during challenge testing;

C_f = the feed concentration measured during the challenge test; and

C_p = the filtrate concentration measured during the challenge test.

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

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

10.14.20.1.9 If fewer than 20 filters are tested, the overall removal efficiency for the filter product line must be set equal to the lowest LRVfilter among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line must be set equal to the 10th percentile of the set of LRV_{filter} values for the various filters tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

10.14.20.1.10 If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted to the Division.

10.14.20.2 Membrane filtration.

10.14.20.2.1 Systems receive *Cryptosporidium* treatment credit for membrane filtration that meets the criteria of this paragraph. Membrane cartridge filters that meet the definition of membrane filtration in Section 1.0 are eligible for this credit. The level of treatment credit a system

receives is equal to the lower of the values determined under subsections 10.14.20.2.1.1 and 10.14.20.2.1.2.

10.14.20.2.1.1 The removal efficiency demonstrated during challenge testing conducted under the conditions in subsection 10.14.20.2.2.

10.14.20.2.1.2 The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in subsection 10.14.20.2.3.

10.14.20.2.2 Challenge Testing. The membrane used by the system must undergo challenge testing to evaluate removal efficiency, and the system must report the results of challenge testing to the Division. Challenge testing must be conducted according to the criteria in subsections 10.14.20.2.2.1 through 10.14.20.2.2.7. Systems may use data from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria in subsections 10.14.20.2.2.1 through 10.14.20.2.2.7.

10.14.20.2.2.1 Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

10.14.20.2.2.2 Challenge testing must be conducted using *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.

10.14.20.2.2.3 The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation:

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

10.14.20.2.2.4 Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric percent of feed water that is converted to filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process (i.e., backwashing).

10.14.20.2.2.5 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:

$$LRV = LOG_{10}(C_f) \times LOG_{10}(C_p)$$

Where:

LRV = log removal value demonstrated during the challenge test;

C_f = the feed concentration measured during the challenge test; and

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

10.14.20.2.2.6 The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ($LRV_{C\text{-}Test}$). If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then $LRV_{C\text{-}Test}$ is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

10.14.20.2.2.7 The challenge test must establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the *Cryptosporidium* removal capability of the membrane filtration module. This performance test must be applied to each production

membrane module used by the system that was not directly challenge tested in order to verify *Cryptosporidium* removal capability. Production modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.

10.14.20.2.2.8 If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the Division.

10.14.20.2.3 *Direct integrity testing*. Systems must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in subsections 10.14.20.2.3.1 through 10.14.20.2.3.6. A direct integrity test is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (i.e., one or more leaks that could result in contamination of the filtrate).

10.14.20.2.3.1 The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

10.14.20.2.3.2 The direct integrity method must have a resolution of 3 micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.

10.14.20.2.3.3 The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the Division, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the approach in either subsection 10.14.20.2.3.3.1 or 10.14.20.2.3.3.2 as applicable to the type of direct integrity test the system uses.

10.14.20.2.3.3.1 For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation:

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

Where:

LRV_{DIT} = the sensitivity of the direct integrity test;

Q_p = total design filtrate flow from the membrane unit;

Q_{breach} = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured, and

VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

10.14.20.2.3.3.2 For direct integrity tests that use a particulate or molecular marker, the direct integrity test sensitivity must be calculated according to the following equation:

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

Where:

LRV_{DIT} = the sensitivity of the direct integrity test;

C_f = the typical feed concentration of the marker used in the test; and C_p = the filtrate concentration of the marker from an integral membrane unit.

10.14.20.2.3.4 Systems must establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the Division.

10.14.20.2.3.5 If the result of a direct integrity test exceeds the control limit established under subsection 10.14.20.2.3.4, the system must remove the membrane unit from service. Systems must conduct a direct integrity test to verify any repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.

10.14.20.2.3.6 Systems must conduct direct integrity testing on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation. The Division may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium*, or reliable process safeguards.

10.14.20.2.4 *Indirect integrity monitoring*. Systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in subsections 10.14.20.2.4.1 through 10.14.20.2.4.5. Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in subsections 10.14.20.2.3.1 through 10.14.20.2.3.5 is not subject to the requirements for continuous indirect integrity monitoring. Systems must submit a monthly report to the Division summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.

10.14.20.2.4.1 Unless the Division approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.

10.14.20.2.4.2 Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.

10.14.20.2.4.3 Continuous monitoring must be separately conducted on each membrane unit.

10.14.20.2.4.4 If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (i.e., two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit as specified in subsections 10.14.20.2.3.1 through 10.14.20.2.3.5.

10.14.20.2.4.5 If indirect integrity monitoring includes a Division-approved alternative parameter and if the alternative parameter exceeds a Division-approved control limit for a period greater than 15 minutes, direct integrity testing must immediately be performed on the associated membrane units as specified in subsections 10.14.20.2.3.1 through 10.14.20.2.3.5.

10.14.20.3 *Second stage filtration*. Systems receive 0.5-log *Cryptosporidium* treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC, or other fine grain media following granular media filtration if the Division approves. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat the entire plant flow taken from a surface water or GWUDI source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The Division must approve the treatment credit based on an assessment of the design characteristics of the filtration process.

10.14.20.4 *Slow sand filtration (as secondary filter)*. Systems are eligible to receive 2.5-log *Cryptosporidium* treatment credit for a slow sand filtration process that follows a separate stage of filtration if both filtration stages treat entire plant flow taken from a surface water or GWUDI source and no disinfectant residual is present in the influent water to the slow sand filtration process. The Division must approve the treatment credit based on an assessment of the design characteristics of the filtration process. This paragraph does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.

10.14.21 Inactivation toolbox components

10.14.21.1 Calculation of CT values.

10.14.21.1.1 CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems with treatment credit for chlorine dioxide or ozone under subsection 10.14.21.2 or 10.14.21.3 must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in subsection 10.6.

10.14.21.1.2 Systems with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, systems must add the *Cryptosporidium* CT values in each segment to determine the total CT for the treatment plant.

10.14.21.2 CT values for chlorine dioxide and ozone.

10.14.21.2.1 Systems receive the *Cryptosporidium* treatment credit listed in this table by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in subsection 10.14.21.1.

CT Values (mg-min/L) for *Cryptosporidium* Inactivation by Chlorine Dioxide [1]

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

[1] Systems may use this equation to determine log credit between the indicated values: Log credit = (0.001506 x $(1.09116)^{Temp}$)x CT.

10.14.21.2.2 Systems receive the *Cryptosporidium* treatment credit listed in this table by meeting the corresponding ozone CT values for the applicable water temperature, as described in subsection 10.14.21.1.

CT Values (mg-min/L) for *Cryptosporidium* Inactivation by Ozone[1]

Log credit	Water Temperature, °C										
	<0.5	1	2	3	5	7	109	15	20	25	30
(i) 0.25	6.0	5.8	5.2	4.8	4.0	3.3	2.5	1.6	1.0	0.6	0.39
(ii) 0.5	12	12	10	9.5	7.9	6.5	4.9	3.1	2.0	1.2	0.78
(iii) 1.0	24	23	21	19	16	13	9.9	6.2	3.9	2.5	1.6
(iv) 1.5	36	35	31	29	24	20	15	9.3	5.9	3.7	2.4
(v) 2.0	48	46	42	38	32	26	20	12	7.8	4.9	3.1
(vi) 2.5	60	58	52	48	40	33	25	16	9.8	6.2	3.9
(vii) 3.0	72	69	63	57	47	39	30	19	12	7.4	4.7

[1] Systems may use this equation to determine log credit between the indicated values: Log credit = (0.0397 x $(1.09757)^{Temp}$) x CT.

10.14.21.3 Site-specific study. The Division may approve alternative chlorine dioxide or ozone CT values to those listed in subsection 10.14.21.2 on a site-specific basis. The Division must base this approval on a site-specific study a system conducts that follows a Division-approved protocol.

10.14.21.4 Ultraviolet light. Systems receive *Cryptosporidium*, *Giardia lamblia*, and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in subsection 10.14.21.4.1. Systems must validate and monitor UV reactors as described in subsections 10.14.21.4.2 and 10.14.21.4.3 to demonstrate that they are achieving a particular UV dose value for treatment credit.

10.14.21.4.1 UV dose table. The treatment credits listed in this table are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, systems must demonstrate an equivalent germicidal dose through reactor validation testing, as described in subsection 10.14.21.4.2. The UV dose values in this table

are applicable only to post-filter applications of UV in filtered systems and to unfiltered systems.

UV Dose Table for *Cryptosporidium*, *Giardia lamblia*, and Virus Inactivation Credit

Log credit	***Cryptosporidium*** **UV dose (mJ/cm^2)**	**Giardia lamblia** **UV dose (mJ/cm^2)**	**Virus** **UV dose (mJ/cm^2)**
(i) 0.5	1.6	1.5	39
(ii) 1.0	2.5	2.1	58
(iii) 1.5	3.9	3.0	79
(iv) 2.0	5.8	5.2	100
(v) 2.5	8.5	7.7	121
(vi) 3.0	12	11	143
(vii) 3.5	15	15	163
(viii) 4.0	22	22	186

10.14.21.4.2 Reactor validation testing. Systems must use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in subsection 10.14.21.4.1 (i.e., validated operating conditions). These operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status.

10.14.21.4.2.1 When determining validated operating conditions, systems must account for the following factors: UV absorbance of the water; lamp fouling and aging; measurement uncertainty of on-line sensors; UV dose distributions arising from the velocity profiles through the reactor; failure of UV lamps or other critical system components; and inlet and outlet piping or channel configurations of the UV reactor.

10.14.21.4.2.2 Validation testing must include the following: Full scale testing of a reactor that conforms uniformly to the UV reactors used by the system and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

10.14.21.4.2.3 The Division may approve an alternative approach to validation testing.

10.14.21.4.3 Reactor monitoring.

10.14.21.4.3.1 Systems must monitor their UV reactors to determine if the reactors are operating within validated conditions, as determined under subsection 10.14.21.4.2. This monitoring must include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the Division designates based on UV reactor operation. Systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol the Division approves.

10.14.21.4.3.2 To receive treatment credit for UV light, systems must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in subsections 10.14.21.4.1 and 10.14.21.4.2 of this section. Systems must demonstrate compliance with this condition by the monitoring required under subsection 10.14.21.4.3.1.

10.14.22 Reporting requirements

10.14.22.1 Systems must report sampling schedules under subsection 10.14.3 and source water monitoring results under subsection 10.14.7 unless they notify the Division that they will not conduct source water monitoring due to meeting the criteria of subsection 10.14.2.4.

10.14.22.2 Systems must report the use of uncovered finished water storage facilities to the Division as described in subsection 10.14.15.

10.14.22.3 Filtered systems must report their *Cryptosporidium* bin classification as described in subsection 10.14.11.

10.14.22.4 Unfiltered systems must report their mean source water *Cryptosporidium* level as described in section 10.14.13.

10.14.22.5 Systems must report disinfection profiles and benchmarks to the Division as described in subsections 10.14.9 through 10.14.10 prior to making a significant change in disinfection practice.

10.14.22.6 Systems must report to the Division in accordance with the following table for any microbial toolbox options used to comply with treatment requirements under subsections 10.14.12 or 10.14.13.

10.14.22.6.1 Alternatively, the Division may approve a system to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.

Microbial Toolbox Reporting Requirements

Toolbox option	**Systems must submit the following information**	**On the following schedule**
(1) Watershed control program (WCP)	(1) Notice of intention to develop a new or continue an existing watershed control program.	No later than two years before the application treatment compliance date in subsection 10.14.14.
	(2) Watershed control plan	No later than one year before the application compliance date in subsection 10.14.14.
	(3) Annual watershed control program status report	Every 12 months, beginning one year after the applicable treatment compliance date in subsection 10.14.14.
	(4) Watershed sanitary survey report	For community water systems, every three years beginning three years after the applicable treatment compliance date in subsection 10.14.14. For non-community water systems, every five years beginning five years after the applicable treatment compliance date in subsection 10.14.14.
(2) Alternative source/intake management	Verification that system has relocated the intake or adopted the intake withdrawal procedure reflected in monitoring results.	No later than applicable treatment compliance date in subsection 10.14.14.
(3) Presedimentation	Monthly verification of the following: (1) Continuous basin operation; (2) Treatment of 100% of the flow; (3) Continuous addition of a coagulant; and, (4) At least 0.5-log mean reduction of influent turbidity or compliance with alternative Division-approved performance criteria.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.
(4) Two-stage lime softening	Monthly verification of the following: (1) Chemical addition and hardness precipitation occurred in two separate and sequential softening stages prior to filtration; and, (2) Both stages treated 100% of the plant flow.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.

(5) Bank filtration	(1) Initial demonstration of the following: (A) Unconsolidated, predominantly sandy aquifer; and (B) Setback distance of at least 25 ft. (0.5-log credit) or 50 ft. (1.0-log credit)	No later than the applicable compliance date in subsection 10.14.14.
	(2) If monthly average of daily max turbidity is greater than 1 NTU then the system must report result and submit an assessment of the cause.	Report within 30 days following the month in which the monitoring was conducted, beginning on the applicable compliance date in subsection 10.14.14.
(6) Combined filter performance	Monthly verification of combined filter effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the 4 hour CFE measurements taken each month.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.
(7) Individual filter performance	Monthly verification of the following: (1) Individual filter effluent (IFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the samples each month in each filter; and, (2) No individual filter greater than 0.3 NTU in two consecutive readings 15 minutes apart.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.
(8) Demonstration of performance	(1) Results from testing following a Division approved protocol.	No later than the applicable compliance date in subsection 10.14.14.
	(2) As required by the Division, monthly verification of operation within conditions of Division approval for demonstration of performance credit.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.
(9) Bag filters and cartridge filters	(1) Demonstration that the following criteria are met: (A) Process meets the definition of bag or cartridge filter; and, (B) Removal efficiency established through challenge testing that meets criteria in this section.	No later than applicable treatment compliance date in subsection 10.14.14.
	(2) Monthly verification that 100% of plant flow was filtered.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.
(10) Membrane filtration	(1) Results of verification testing demonstrating the following: (A) Removal efficiency established through challenge testing that meets criteria in this section: and, (B) Integrity test method and parameters, including resolution, sensitivity, test frequency, control limits, and associated baseline.	No later than the applicable treatment compliance date in subsection 10.14.14.
	(2) Monthly report summarizing the following: (A) All direct integrity tests above the control limit: and, (B) If applicable, any turbidity or alternative Division-approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.

(11) Second stage filtration	Monthly verification that 100% of flow was filtered through both stages and that first stage was preceded by coagulation step.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.
(12) Slow sand filtration (as secondary filter)	Monthly verification that both a slow sand filter and a preceding separate stage of filtration treated 100% of flow from subpart H sources.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.
(13) Chlorine dioxide	Summary of CT values for each day as described in subsection 10.14.21.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.
(14) Ozone	Summary of CT values for each day as described in subsection 10.14.21	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.
(15) UV	(1) Validation test results demonstrating operating conditions that achieve required UV dose.	No later than the applicable treatment compliance date in subsection 10.14.14.
	(2) Monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose as specified in subsection 10.14.21.4.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 10.14.14.

10.14.23 Recordkeeping requirements

10.14.23.1 Systems must keep results from the initial round of source water monitoring under subsection 10.14.2.1 and the second round of source water monitoring under subsection 10.14.2.2 until 3 years after bin classification under subsection 10.14.11 for filtered systems or determination of the mean *Cryptosporidium* level under subsection 10.14.11 for unfiltered systems for the particular round of monitoring.

10.14.23.2 Systems must keep any notification to the Division that they will not conduct source water monitoring due to meeting the criteria of subsection 10.14.2.4 for 3 years.

10.14.23.3 Systems must keep the results of treatment monitoring associated with microbial toolbox options under subsections 10.14.17 through 10.14.21 and with uncovered finished water reservoirs under subsection 10.14.15, as applicable, for 3 years.

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

10.14.24.1 A sanitary survey is an onsite review of the water source (identifying sources of contamination by using results of source water assessments where available), facilities, equipment, operation, maintenance, and monitoring compliance of a PWS to evaluate the adequacy of the PWS, its sources and operations, and the distribution of safe drinking water.

10.14.24.2 For the purposes of this section, a significant deficiency includes a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that EPA determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.

10.14.24.3 For sanitary surveys performed by EPA, systems must respond in writing to significant deficiencies identified in sanitary survey reports no later than 45 days after receipt of the report, indicating how and on what schedule the system will address significant deficiencies noted in the survey.

10.14.24.4 Systems must correct significant deficiencies identified in sanitary survey reports according to the schedule approved by EPA, or if there is no approved schedule, according to the schedule reported under subsection 10.14.24.3 if such deficiencies are within the control of the system.

1.0 General Provisions

1.1 "**Application**": These regulations shall apply to all public water systems in the State of Delaware.

1.2 "**Variance**": Variances will not be issued under these regulations.

1.3 "**Exemption**": Exemptions will not be issued under these regulations.

1.4-1.5 Missing section numbers are reserved.

1.6 Right of Entry: The Director of the Division or his/her designee shall have the right of entry, during reasonable hours and in a reasonable manner and without fee or hindrance, for the purpose of conducting a sanitary survey and/or sampling of any public water supply and all water furnished by any public water supplier, whether or not the Division has evidence that the system is in violation of an applicable legal requirement.

1.7 Prohibiting Water Usage: The Division may prohibit the use of sources of water which after treatment do not provide water conforming to the standards established by these Regulations or which for any reason may pose a threat to the public's health.

1.8 Separability: If any provision of these Regulations is held invalid, such invalidity shall not affect other provisions which can be given effect without the invalid provision.

1.9 Enforcement of Regulations:

1.9.1 All PWSs must be operated in compliance with the requirements as set forth in these Regulations.

1.9.1.1 Notice: Whenever the Director of the Division, or his/her appointed representative, has reason to believe that a violation of any of these Regulations has occurred or is occurring; the Division shall notify the alleged violator. Such notice shall be in writing, may be sent by Certified Mail, or hand delivered, shall cite the Regulation or Regulations that are allegedly being violated, and shall state the facts which form the basis for believing that the violation has occurred or is occurring.

1.9.1.2 Orders: Notice of a violation may be accompanied by an order that requires that certain corrective action be taken. The order shall be signed by the Director or his/her designee or any of his/her appointed representatives and may require:

1.9.1.2.1 The immediate cessation or correction of the violation.

1.9.1.2.2 The acquisition or use of additional equipment, supplies or personnel to insure that the violation does not recur.

1.9.1.2.3 The submission of a plan to prevent future violations to the Division for review and approval.

1.9.1.2.4 Any other corrective action deemed necessary for proper compliance with the Regulations including interim remedies pending correction of violations.

1.9.1.3 Hearing Request: Any supplier of water who receives an order from the Division may submit a request for a hearing to the Secretary, Delaware Health and Social Services to contest the order.

1.9.1.4 Compliance with Effective Orders: Should any public water supplier fail to comply with any of these Regulations, the Secretary, Delaware Health and Social Services may apply to an appropriate court for an injunction or other legal process to prevent or stop any practice which is in violation of these regulations.

1.9.1.5 Penalties: The Secretary, Delaware Health and Social Services shall have the authority to impose an administrative penalty upon any public water system that refuses, fails or neglects to perform the duties required of it pursuant to Title 16, Chapter 1, §122(3)(C). The administrative penalty shall be as follows:

1.9.5.1.1 For systems serving a population of more than 10,000 people, not less than $1,000 nor more than $10,000 per day per violation; and

1.9.5.1.2 For any other system, the administrative penalty shall be not less than $100 or more than $10,000 per day per violation.

1.10 Emergency Orders: The Director of the Division or his/her appointed representative may issue emergency orders in any case where there is an imminent danger to the health of the public resulting from the operation of any waterworks or the source of a water supply. An emergency order may be communicated by the best practical notice under the circumstances, and is effective immediately upon receipt. The order may state any requirements necessary to remove the danger to the health of the public, including the immediate cessation of the operation of the PWS. Emergency orders shall be effective for a period not exceeding sixty (60) days at the determination of the Director of the Division or his/her representative. Should any public water supplier fail to comply with an emergency order, the Secretary, Delaware Health and Social Services may apply to an appropriate court for an injunction or other legal process to prevent or stop any practice which is in violation of these Regulations.

1.11 Plans and Specifications:

1.11.1 No person shall construct a new PWS or alter an existing PWS without a Certificate of Approval for Construction.

1.11.1.1 Systems shall submit two (2) copies of plans and specifications. Plans shall be developed using Construction Plans and Specifications Submittal and Review Guidelines, (Copies are available from the Office of Drinking Water), utilizing the latest edition of Ten States Standards, NSF Standards, AWWA Standards, or approved equivalent and other technical information as required by the Division.

1.11.1.2 Construction shall be in accordance with the approved plans and all conditions listed in the Certificate of Approval to Construct.

1.11.1.3 Whenever it is discovered that either of the above are occurring without such approval, the Director of the Division may order the owner, supplier of water or contractor to immediately stop the work and submit plans and specifications to the Division. After the submittal, any part of the system that has already been installed and is not in compliance shall be removed, altered or replaced in order to achieve compliance.

1.11.1.4 Plans and specifications shall be on paper no larger than 30" x 42". Within thirty (30) days of receipt of plans and specifications, the Division shall notify the person who submitted the plans and specifications if they have been approved or disapproved. Such notice shall specify any conditions of approval or any reasons for disapproval. Approvals are valid for one (1) year and construction shall begin within that time. All construction shall be in accordance with the approved plans and all conditions listed in the Certificate of Approval.

1.11.2 Effective October 1, 1999, all new community and non-transient non-community systems must comply with section 1.11.1, and, in addition, submit an Application for Capacity Development review. The application is available from the Office of Drinking Water.

1.12 Approval of Water Supplies:

1.12.1 No person shall operate a newly constructed public water system or renovated portion of an existing water system without a Certificate of Approval to Operate. A Certificate of Approval to Operate shall be issued by the Division to water systems which meet the following requirements:

1.12.1.1 Compliance with rules and regulations to prevent development of health hazards;

1.12.1.2 Adequate protection of the water quality throughout all parts of the system, as demonstrated by sanitary surveys;

1.12.1.3 Proper operation of the water supply system under the responsible charge of personnel whose qualifications meet the certification requirements of the Division;

1.12.1.4 Adequate capacity to meet anticipated peak demands while maintaining not less than twenty-five (25) pounds per square inch (psi) and not more than one hundred (100) psi at ground level at all points in the water distribution system and;

1.12.1.5 Records of laboratory examinations showing compliance with the water quality requirements of these Regulations.

1.12.1.5.1 Submission of as-built plans per the Construction Plans and Specifications Submittal and Review Guidelines, copies available from the Office of Drinking Water.

1.12.2 Effective October 1, 1999, in addition to the requirements in 1.12.1, approval of new community and non-transient non-community water systems shall be dependent upon the following:

1.12.2.1 A certification by a professional engineer that the system was built in accordance with approved plans and specifications and all conditions of the Certificate of Approval to Construct and.

1.12.2.2 Managerial and financial information as required by the Division to demonstrate compliance with Capacity as defined in section 1.1. This information may include, but not be limited to; annual reports, water system plans or business plans, self-assessments/peer reviews, criteria used by lenders, financial viability assessment methods, financial and managerial training.

1.12.2.3 Failure to comply with 1.12.2.1 and 1.12.2.2 shall result in the Division denying the application for a Certificate of Approval to Operate. A new water system shall not commence operations without a Certificate of Approval to Operate.

1.13 Siting Requirements:

1.13.1 Before any person may enter into a financial commitment for or initiate construction of a new PWS or increase the capacity of an existing PWS, he shall notify the Division and, to the extent practicable, avoid locating part or all of the new or expanded facility at a site which:

1.13.1.1 Is subject to a significant risk from earthquakes, floods, fires or other disasters which could cause a breakdown of the PWS or a portion thereof or;

1.13.1.2 Except for intake structures, is within the floodplain of a one hundred (100) year flood or is lower than any recorded high tide where appropriate records exist.

1.14 Approved Laboratory:

1.14.1 For the purpose of determining compliance with sections 1.12.1.5, 7.0, 8.0, 9.0, 10.0, 13.0, 15.0, 16.0, 17.0, 18.0, and 21.0 samples may be considered only if they have been analyzed by the Division, EPA, or an approved laboratory, except that measurements for alkalinity, calcium, conductivity, disinfectant residual, orthophosphate, silica, turbidity, free chlorine residual, temperature and pH may be performed by any person acceptable to the Division.

1.14.2 Laboratory Certification Process: Continuation of laboratory certification for conducting drinking water analyses is contingent upon successful, on-going compliance with the most recent edition of the "Manual for the Certification of Laboratories Analyzing Drinking Water." Copies are available from the Office of Drinking Water.

1.14.3 Annual laboratory proficiency testing:

1.14.3.1 In order to demonstrate proficiency a laboratory shall successfully analyze a proficiency test (PT) from an approved provider annually using the same analytical method that is used to report compliance-monitoring results. In order to receive and maintain certification for an analyte, the laboratory shall successfully analyze PT samples using EPA-approved methods in accordance with 40CFR 141, copies are available from the Office of Drinking Water, for each analyte (microbiological and/or chemical) and by each method used to analyze compliance samples.

1.14.3.2 In order to receive annual certification, laboratories located in Delaware, shall complete a PT in the first quarter of the calendar year. Failure to complete the PT within the first quarter will result in the laboratory status being downgraded to "provisional". If a laboratory fails to get an acceptable result on a PT then they shall complete a make-up PT for those analytes that were unacceptable in the original PT within 60 days of the notification by the Division. Failure to successfully complete the make-up PT will result in the laboratories status being downgraded to "not certified."

1.14.3.3 In order for the Division to accept compliance results from laboratories located outside of Delaware, the laboratory must comply with the requirements of their home state. In addition, they must submit copies of their home state certification, copies of the last two PTs and a copy of their Quality Assurance program prior to or at the time that compliance samples are submitted to the Division.

1.14.3.4 Annual certified analyte lists for in-state laboratories will be issued on July 1 of each year and expire on June 30 of the following year.

1.14.4 Reporting by laboratories: Laboratories that analyze compliance samples for public water systems in Delaware must report the results to the public water system in a timely manner and if a MCL or Action Level (AL) exceedance occurs then the Office of Drinking Water must be notified in accordance with the following:

1.14.4.1 Microbiological samples: If the original sample or one or more repeat samples are positive for fecal coliforms or E. coli, the laboratory must report the results by the end of the business day, or if it is after business hours, then by then end of the next business day

1.14.4.2 Chemical samples: If a sample exceeds a MCL or AL as specified in these regulations the laboratory must report the results by the end of the business day, or if it is after business hours, then by the end of the next business day.

1.14.5 Notification of major changes: Certified laboratories must notify the Division, in writing, within 30 days of major changes in personnel that impact who is conducting the analysis, new equipment, new methods being used, or laboratory re-location.

1.15 Quality. Drinking water shall not contain impurities in concentrations which may be hazardous to the health of the consumers. Substances used in its treatment shall not remain in the water in concentrations greater than required by good practice. Substances which may have deleterious physiological effects, or for which physiological effects are not known, shall not be introduced into the system in a manner which would permit them to reach the consumer. For the purpose of these regulations interim health-based standards shall be set by the Division on a case-by-case basis at a level between 10-4 to 10-6 risk level for those contaminants that are potential carcinogens and a Hazard Quotient of 1 to 10 for non-cancer health effects based on the best available science at the time. These standards shall be enforceable. For the purpose of these regulations Hazard Quotient shall mean expressions applied to modeled human health risk values associated with exposures to systemic, non-cancer causing contaminants.

1.16 Required Sampling, Monitoring or Analyses:

1.16.1 In any case where the Division does not perform sampling, monitoring or analyses required by these Regulations, the supplier of water shall be responsible for performing this sampling, monitoring or analyses.

1.16.2 Monitoring of consecutive public water systems: When a public water system supplies water to one or more other public water systems, the Division may modify the monitoring requirements imposed by these regulations to the extent that the interconnection of the systems justifies treating them as a single system for monitoring purposes. Any modified monitoring shall be conducted pursuant to a schedule specified by the Division and concurred with by the Administrator of the US Environmental Protection Agency.

1.17 Use of Bottled Water. Public water systems shall not use bottled water to achieve compliance with a MCL. Bottled water may be used on a temporary basis to avoid unreasonable risk to health.

1.18 Regulatory Classification:

1.18.1 All public water systems shall:

1.18.1.1 Meet all bacteriological requirements;

1.18.1.2 Meet the nitrate and nitrite requirements and;

1.18.1.3 Conform to provisions of Section 7.0.

1.18.2 All community and non-transient non-community public water systems as defined in Section 2.0 shall:

1.18.2.1 Meet all the requirements of subsection 1.18.1 and;

1.18.2.2 Meet all other Primary Standards and;

1.18.2.3 Meet all requirements of Sections 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0 (community water systems only), 17.0, 18.0, 19.0, 20.0 and 21.0.

1.18.3 All community public water systems as defined in Section 2.0 and that serve more than 500 service connections within the state shall:

1.18.3.1 Meet all requirements of subsection 1.18.1 and;

1.18.3.2 Meet all requirements of subsection 1.18.2 and;

1.18.3.3 Meet all other primary and secondary standards.

1.19 Disinfection

1.19.1 When it is specifically required by these regulations, or when it is deemed to be required to ensure compliance with Section 3.0 or where it is demonstrated through bacteriological testing that there is a need for disinfection, continuous disinfection shall be provided. The disinfection shall be chlorine, unless a substitute is approved prior to installation. Plans and specifications for the disinfection system shall be approved in accordance with subsection 1.11. When the disinfection is instituted, it shall be operated such that a free chlorine residual of at least 0.3 mg/L is maintained throughout the water distribution system. The supplier of water shall keep accurate records of the amount of chlorine used and shall have an approved test kit for measuring both free and total chlorine residuals. The supplier of water shall be required to conduct chlorine residual testing at least daily unless a lesser frequency is approved in writing by the Division, and shall report these results to the Division on a monthly basis in accordance with subsection 4.1.1. If a substitute disinfectant is approved, the operational and monitoring requirements shall be specified by the Division.

1.19.2 Public water systems must measure residual disinfectant concentrations with one of the analytical methods in the following table. Except for the method for ozone residuals, the disinfectant residual methods are contained in the 18th, 19th, and 20th editions of Standard Methods for the Examination of Water and Wastewater, 1992, 1995, and 1998 respectively; the cited methods published in any of these three editions may be used. The ozone method, 45400-O3 B, is contained in both the 18th and 19th editions of Standard Methods for the Examination of Water and Wastewater, 1992, 1995 respectively; either edition may be used. If approved by the Division, residual concentrations for free chlorine and combined chlorine also may be measured by using DPD colorimetric test kits. Free and total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument provided the chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five days, or with a protocol approved by the Division.

Residual	Methodology	Methods

Free Chlorine	Amperometric Titration	4500-Cl D
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Syringaldazine (FACTS)	4500-Cl H
Total Chlorine	Amperometric Titration	4500-Cl D
	Amperometric Titration (low level measurement)	4500-Cl E
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Iodometric	4500-Cl I
Chlorine Dioxide	Amperometric Titration	4500-ClO_2 C
	DPD Method	4500-ClO_2 D
	Amperometric Titration	4500-ClO_2 E
Ozone	Indigo Method	4500-O_3 B

1.19.3 Maximum Residual Disinfection Levels (MRDLs):

1.19.3.1 Maximum residual disinfection levels are as follows:

Disinfectant residual	**MRDL (mg/L)**
Chlorine	4.0 (as Cl_2)
Chloramines	4.0 (as Cl_2)
Chlorine Dioxide	0.8 (as ClO_2)

1.19.3.3 The Administrator, U.S. Environmental Protection Agency, pursuant to section 1412 of the Safe Drinking Water Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum residual disinfectant levels identified in subsection 1.19.3.1: control of treatment processes to reduce disinfectant demand; and control of disinfection treatment processes to reduce disinfectant levels.

1.20 Compliance dates:

1.20.1 CWSs and NTNCWSs. Surface water or ground water under the direct influence of surface water systems serving 10,000 or more persons must comply with Section 21.0 beginning December 16, 2001. Surface water or ground water under the direct influence of surface water systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with Section 20.0 beginning December 16, 2003.

1.20.2 Transient NCWSs. Surface water or ground water under the direct influence of surface water systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning December 16, 2001. Surface water or ground water under the direct influence of surface water systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning December 16, 2003.

2.0 Definitions

The following words and terms, when used in this regulation, have the following meaning unless the context clearly indicates otherwise:

"**Action Level**" means the concentration of lead or copper in water specified in subsections 10.1.1.1 and 10.1.1.2 which determines, in some cases, the treatment requirements contained in Section 10 that a water system is required to complete.

"**Alpha Particle**" means a particle identical with a helium nucleus, emitted from the nucleus of a radioactive element.

"**Approved**" means approved by the Division.

"**Bag Filters**" means pressure-driven separation devices that remove particulate matter larger than 1 (one) micrometer using an engineered porous filtration media. They are typically constructed of a non-rigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to the outside.

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

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

"**Beta Particle**" means a particle identical with an electron, emitted from the nucleus of a radioactive element.

"**Capacity**" means the overall capability of a water system to reliably produce and deliver water meeting all national primary drinking water regulations. Capacity encompasses the technical, managerial, and financial capabilities that will enable a water system to plan for, achieve, and maintain compliance with applicable drinking water standards.

- Technical Capacity refers to the physical infrastructure of water system, including but not limited to, the adequacy of the source water, infrastructure (source, treatment, storage, and distribution), and the ability of system personnel to implement the requisite technical knowledge.
- Managerial Capacity refers to the management structure of the water system, including but not limited to ownership accountability, staffing and organization, and effective linkages.
- Financial Capacity refers to the financial resources of the water system, including but not limited to revenue sufficiency and fiscal controls.

"**Cartridge Filters**" mean pressure-driven separation devices that remove particulate matter larger than 1 (one) micrometer using an engineered porous filtration media. They are typically constructed as rigid or semi-rigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.

"**Clean Compliance History**" means a record of no MCL violations under subsection 7.2; no monitoring violations under subsections 7.1 or 7.4; and no coliform treatment technique trigger exceedances or treatment technique violations under subsection 7.4.

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

"**Coliform Group**" means all organisms considered in the coliform group as set forth in the current edition of Standard Methods for the Examination of Water and Waste Water prepared and published jointly by the American Public Health Association, American Water Works Association and Water Pollution Control Federation.

"**Combined Distribution System**" means the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

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

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

"**Comprehensive Performance Evaluation**" or "**CPE**" means a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. The comprehensive performance evaluation must consist of at least the following components: Assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

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

"**Consecutive Water Supply**" means a public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems. This part shall apply to each public water system, unless the public water system meets all of the following conditions: a) Consists only of distribution and storage facilities (and does not have any collection and treatment facilities); b) Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply; c) Does not sell water to any person; and, d) Is not a carrier which conveys passengers in interstate commerce. The Division may opt to accept a consecutive supply as a single system for monitoring purposes.

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

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

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

"**CT or CTcalc**" means the product of the residual disinfectant concentration (C) in milligrams per liter (mg/L) determined before or at the first customer, and the corresponding disinfectant contact time (T) in minutes, i.e. "C" X "T". If a public water system applies disinfectants at more than one (1) point prior to the first customer, it must determine the CT of each disinfectant sequence before or at the first customer to determine the total percent inactivation or total inactivation ratio. In determining the total inactivation ratio, the public water system must determine the residual disinfectant concentration of each disinfection sequence and corresponding contact time before any subsequent disinfection application point(s). CT99.9 is the CT value required for 99.9 percent (3-log) inactivation of Giardia lamblia cysts. The inactivation ratio is the CTcalc divided by the CT99.9 and the total inactivation ratio is the sum of the inactivation ratios for each disinfection sequence. A total inactivation ratio equal to or greater than 1.0 is assumed to provide a 3-log inactivation of Giardia lamblia cysts.

"**Diatomaceous Earth Filtration**" means a process resulting in substantial particulate removal in which a precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum), and while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the feed water to maintain the permeability of the filter cake.

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

"**Direct Responsible Charge**" means accountability for and performance of active, daily, on-site operational duties.

"**Disinfectant**" means any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone added to water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogens (disease causing organisms).

"**Disinfectant Contact Time (T)**" means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration (C) is measured. Where only one (1) "C" is measured, "T" is the time in minutes that it takes for water to move from the point of disinfectant application to a point before or at where residual disinfectant concentration (C) is measured. Where more than one (1) "C" is measured, "T" is for the first measurement of "C", the time in minutes that it takes for water to move from the first or only point of disinfectant application to a point before or at the point where the first "C" is measured and for subsequent measurements of "C", the time in minutes that it takes for water to move from the previous "C" measurement point to the "C" measurement point for which the particular "T" is being calculated. Disinfectant contact time in pipelines must be calculated based on plug flow by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe. Disinfectant contact time within mixing basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.

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

"**Disinfection Profile**" means a summary of daily *Giardia lamblia* inactivation through the treatment plant. The procedure for developing a disinfection profile is contained in subsection 10.8 and in 40 CFR subparts P and T (Copies are available from the Office of Drinking Water).

"**Division**" means the Division of Public Health of the Department of Health and Social Services established by Title 29, Section 7904 (a), Delaware Code.

"**Domestic or Other Non-Distribution System Plumbing Problem**" means a coliform contamination problem in a public water system with more than one (1) service connection that is limited to the specific service connection from which the coliform positive sample was taken.

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

"**Dual Sample Set**" means a set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an Initial Distribution System Evaluation (IDSE) under Section 13.0 and determining compliance with the TTHM and HAA5 MCLs under subsection 9.2.1.2.

"**Dwelling Unit**" means one or more rooms arranged for the use of one or more individuals as a single housekeeping unit with cooking, living, sanitary and sleeping facilities.

"**Effective Corrosion Inhibitor Residual**" means a concentration sufficient to form a passivating film on the interior walls of a pipe.

"**Emergency Situation**" means a condition in which the specific provisions of these Regulations cannot be met for a temporary period and which necessitates immediate action because of the potential danger to public health.

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

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

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

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

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

"**First Draw Sample**" means a one (1) liter sample of tap water, collected in accordance with subsection 10.7.2.2, that has been standing in plumbing pipes at least six (6) hours and is collected without flushing the tap.

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

"**Flowing Stream**" means a course of running water flowing in a definite channel.

"**GAC10**" means granular activated carbon filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days, except that the reactivation frequency for GAC10 used as a best available technology for compliance with MCLs under subsection 9.2.1.2 shall be 120 days.

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

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

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

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

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

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

"**Health Advisory**" or "**HA**" means an estimate of acceptable drinking water levels for a chemical substance based on health effects information; a Health Advisory is not a legally enforceable Federal standard, but serves as technical guidance to assist Federal, State and local officials.

One-Day HA: The concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for up to one day of exposure. The One-Day HA is normally designed to protect a 10-kg child consuming 1 liter of water per day.

Ten-Day HA: The concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for up to ten days of exposure. The Ten-Day HA is also normally designed to protect a 10-kg child consuming 1 liter of water per day.

Lifetime HA: The concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for a lifetime of exposure. The Lifetime HA is based on exposure of a 70-kg adult consuming 2 liters of water per day. The Lifetime HA for Group C carcinogens includes an adjustment for possible carcinogenicity.

"**Health Hazard**" means any condition, device or practice in the water supply system or its operation which creates, or may create, a danger to the health and well-being of the water consumer.

"**Initial Compliance Period**" means the first full three-year compliance period which begins at least 18 months after promulgation, except for the following contaminants: Dichloromethane; 1,2,4-Trichlorobenzene; 1,1,2-Trichloroethane; Benzo[a]pyrene; Dalapon; Di(2-ethylhexyl adipate; Di(2-ethylhexyl) phthalate; Dinoseb; Diquat; Endothall; Endrin; Glyphosate; Hexachlorobenzene; Hexachlorocyclopentadiene; Oxamyl (Vydate); Picloram; Simazine; 2,3,7,8-TCDD (Dioxin); Antimony; Beryllium; Cyanide; Nickel; and Thallium, initial compliance period means the first full three-year compliance period after promulgation for systems with 150 or more service connections (January 1993 -December 1995) and first full three-year compliance period after the effective date of regulation (January 1996 - December 1998) for systems having fewer than 150 service connections.

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

"**Large Water System**" means a water system that serves more than 50,000 persons.

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

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

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

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

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

"**Man-Made Beta Particle and Photon Emitters**" means all radionuclides emitting beta particles and/or photons listed in Maximum Permissible Body Burdens and Maximum Permissible Concentrations of

Radionuclides in Air or Water for Occupational Exposure, NBS Handbook 69, except the daughter products of thorium 232, uranium 235 and uranium 238.

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

"**Maximum Residual Disinfectant Level**" or "**MRDL**" means a level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. For chlorine and chloramines, a PWS is in compliance with the MRDL when the running annual average of monthly averages of samples taken in the distribution system, computed quarterly, is less than or equal to the MRDL. For chlorine dioxide, a PWS is in compliance with the MRDL when daily samples are taken at the entrance to the distribution system and no two consecutive daily samples exceed the MRDL. MRDLs are enforceable in the same manner as maximum contaminant levels under section 1412 of the Safe Drinking Water Act. There is convincing evidence that addition of a disinfectant is necessary for control of waterborne microbial contaminants. Notwithstanding the MRDLs listed in **[40]** CFR section 141.65 (Copies available from the Office of Drinking Water), operators may increase residual disinfectant levels of chlorine or chloramines (but not chlorine dioxide) in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as distribution line breaks, storm runoff events, source water contamination, or cross-connections.

"**Maximum Residual Disinfection Level Goal**" or "**MRDLG**" means the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MRDLGs are non-enforceable health goals and do not reflect the benefit of the addition of the chemical for control of waterborne microbial contaminants.

"**Maximum Total Trihalomethane Potential**" or "**MTP**" means the maximum concentrations of total trihalomethanes produced in a given water containing a disinfectant residual after seven days at a temperature of 25oC or above.

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

"**Medium Size Water System**" means a water system that serves greater than 3,300 and less than or equal to 50,000 persons.

"**Minor Monitoring Violation**" means the failure of a public water system to collect all required water samples or the failure to follow the prescribed sampling procedure within the prescribed time frame.

"**Near the First Service Connection**" means at one (1) of the twenty (20) percent of all service connections in the entire system that are nearest the water supply treatment facility, as measured by water transport time within the distribution system.

"**Optimal Corrosion Control Treatment**" means the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while insuring that the treatment does not cause the water system to violate any national primary drinking water regulations.

"**Person**" means any corporation, company, association, firm, municipally owned water utility, partnership, society and joint stock company, as well as any individual.

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

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

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

"**Point of Entry Treatment Device**" means a treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.

"**Point of Use Treatment Device**" means a treatment device applied to a single tap used for the purpose of reducing contaminants in the drinking water at that one (1) tap.

"**Pollution**" means the presence of anything in water which tends to degrade its quality so as to constitute a health hazard or impair the usefulness of the water.

"**Potable Water**" means water which is in compliance with all of the required drinking water standards specified in these Regulations, and is acceptable for human consumption.

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

"**Primary Maximum Contaminant Level**" or "**PMCL**" means an MCL which involves a biological, chemical or physical characteristic of drinking water that may adversely affect the health of the consumer. This includes the MCLs for: coliform bacteria (includes total coliform and E. coli; antimony; arsenic; asbestos; barium; beryllium; cadmium; chromium; cyanide; fluoride; lead; mercury; nickel; nitrates; nitrites; total nitrate/nitrite selenium; thallium; turbidity; alachlor; atrazine; benzo(a)pyrene; carbofuran; chlordane; dalapon; di(2-ethylhexyl) adipate; di(2-ethylhexyl) phthalate; dibromochloropropane; dinoseb; diquat; 2,4-D; endothall; endrin; ethylenedibromide (EDB); glyphosate; heptachlor; heptachlor epoxide; hexachlorobenzene; hexachlorocyclopentadiene; lindane; methoxychlor; oxamyl (vydate); pentachlorophenol; picloram; polychlorinated biphenyls (PCBs); simazine; 2,3,7,8-TCDD (Dioxin); toxaphene; 2,4,5-TP silvex; total trihalomethanes; benzene; carbon tetrachloride; o-dichlorobenzene; p-dichlorobenzene; 1,2-dichloroethane, 1,1-dichloroetylene; cis-1,2-dichloroethylene; trans-1,2-dichloroethylene; dichloromethane; 1,2-dichlorpropane; ethylbenzene; monochlorobenzene; styrene; tetrachloroethylene; toluene; 1,2,4-trichlorobenzene; 1,1,1-trichloroethane; 1,1,2-trichloroethane; trichloroethylene; vinyl chloride; total xylenes and radioactivity (see Section 9.0).

"**Protection by Adequate Construction, Treatment and Supervision**" means:

Works which are of adequate capacity to meet the maximum demands without creating health hazards and which are located, designed and constructed to eliminate or prevent pollution.

Any one or any combination of the controlled processes of coagulation, sedimentation, absorption, filtration, disinfection or other processes appropriate to the sources of supply, which produces water consistently meeting the requirements of these Regulations.

Conscientious operation of a public water supply by an individual in direct responsible charge who is acceptable to the Division, and meets the certification requirements of the Division.

"**Public Notice Tiers**" means that public notice requirements are divided into three tiers to take into account the seriousness of the violation or situation and any potential adverse health effects that may be involved.

Tier 1 public notice – required for National Primary Drinking Water (NPDWR) violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure.

Tier 2 public notice – required for all other NPDWR violations and situations with potential to have serious adverse effects on human health.

Tier 3 public notice – required for all other NPDWR violations and situations not included in Tier 1 and Tier 2.

"**Public Water System**" or "**PWS**" means a water supply system for the provision to the public of water for human consumption through pipes or other constructed conveyances either directly from the user's free flowing outlet or indirectly by the water being used to manufacture ice, foods and beverages or that supplies water for potable or domestic purposes for consumption in more than three dwelling units, or furnishes water for potable or domestic purposes to employees, tenants, members, guests or the public at large in commercial offices, industrial areas, multiple dwellings or semi-public buildings including, but without limitation, rooming and boarding houses, motels, tourist cabins, mobile home parks, restaurants, hospitals and other institutions, or offers any water for sale for potable domestic purposes. Public water systems are classified as follows:

"**Community Water System**" or "**CWS**" means a public water system which serves at least fifteen (15) service connections used by year-round residents or regularly serves at least twenty-five (25) year-round residents;

"**Miscellaneous Public Water System**" or "**MPWS**" means a public water system that is neither community, transient non-community nor non-transient non-community.

"**Non-Transient Non-Community Water System**" or "**NTNCWS**" means a public water system that is not a community water system and that regularly serves at least twenty-five (25) of the same persons over six (6) months per year;

"**Transient Non-Community Water System**" or "**TNCWS**" means a public water system which has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year;

"**Radioactivity**" means the spontaneous, uncontrollable disintegration of the nucleus of an atom with the emission of particles and rays.

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

"**Repeat Compliance Period**" means any subsequent compliance period after the initial compliance period.

"**Residual Disinfectant Concentration**" or "**C**" means the concentration of disinfectant measured in mg/L in a representative sample of water. Disinfectant levels of <0.04 mg/L shall be considered non-detectable.

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

"**Sanitary Survey**" means a review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of: evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing potable drinking water; or updating the inventory information.

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

"**Secondary Maximum Contaminant Level**" or "**SMCL**" means an MCL which involves a biological, chemical or physical characteristic of water that may adversely affect the taste, odor, color or appearance (aesthetics), which may thereby affect public confidence or acceptance of the drinking water. This includes the MCLs for aluminum, chloride, color, copper, corrosivity, foaming agents, iron, manganese, odor, pH, silver, sulfate, total dissolved solids and zinc.

"**Secretary, Delaware Health and Social Services**" means the agency defined in 29 **Del.C.** §7933.

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

"**Service Connection**" means a water line to a dwelling unit or building.

"**Service Line Sample**" means a one (1) liter sample of water collected in accordance with subsection 10.7.2.3 that has been standing for at least six (6) hours in a service line.

["Significant Deficiency" means a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the Division determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.]

"**Single Family Structure**" means a building constructed as a single family residence that is currently used as either a residence or a place of business.

"**Slow Sand Filtration**" means a process involving passage of raw water through a bed of sand at low velocity (generally less than 0.4 meters per hour) resulting in substantial particulate removal by physical and biological mechanisms.

"**Small Water System**" means a water system that served 3,300 persons or fewer.

"**Source**" means the place from which a system obtains its water. This may be either from underground or from the surface. Surface water may include rivers, lakes, reservoirs, springs, impoundments or a body of water with a surface exposed to the atmosphere.

"**Standard Sample**" means the sample size for bacteriological testing and shall consist of:

For the fermentation tube test, five (5) standard portions of either twenty (20) milliliters (ml) or one hundred (100) ml.

For the membrane filter technique, not less than one hundred (100) ml.

"**Subpart H Systems**" means public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to the filtration and disinfection requirements of these regulations.

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

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

"**SUVA**" means Specific Ultraviolet Absorption at 254 nanometers (nm), an indicator of the humic content of water. It is a calculated parameter obtained by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV254) (in **[c]**m-1) by its concentration of dissolved organic carbon (DOC) (in mg/L).

"**System with a Single Service Connection**" means a system which supplies drinking water to consumers via a single service line.

"**Too Numerous to Count**" means that the total number of bacterial colonies exceeds two hundred (200) on a forty-seven (47) millimeter (mm) diameter membrane filter used for coliform detection.

"**Total Coliform-Positive Sample**" means any Presence-Absence (P-A) Coliform Test with a result of present (P), any Minimal Medium ONPG-MUG (MMO-MUG) Test with a result of P, any Membrane Filter Technique test with a result of one (1) or more colonies per one hundred (100) ml, or any Multiple Tube Fermentation test with a result of one (1) or more positive tubes.

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

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

"**Treatment Technique Requirement**" means a requirement which specifies for a contaminant a specific treatment technique(s) demonstrated to the satisfaction of the Division to lead to a reduction in the level of such contamination sufficient to comply with these Regulations.

"**Trihalomethanes**" or "**THMs**" means one of the family of organic compounds, named as derivatives of methane, wherein three (3) of the four (4) hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

"**Turbidity**" means a measure of the clarity or cloudiness of water in Nephelometric Turbidity Units or NTUs.

"**Two-stage Lime Softening**" means a process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes in series prior to filtration.

"**Uncovered Finished Water Storage Facility**" means a tank, reservoir, or other facility used to store water that will undergo no further treatment to reduce microbial pathogens except residual disinfection and is directly open to the atmosphere. Finished water storage facilities that are properly covered, screened and vented are excluded from this definition.

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

"**Vulnerable**" means subject to contamination, a determination which shall be made by the Division based on previous monitoring results, the number of persons served by the public water system, the proximity of a smaller system to a larger system, the proximity to commercial or industrial use, disposal or storage of volatile synthetic organic compounds (VOCs), and the protection of the water source(s).

"**Waterborne Disease Outbreak**" means the significant occurrence of an acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment, as determined by the Division.

"**Water Distribution System**" means the pumps, piping and storage facilities from the source(s)/treatment plant to the property line of the ultimate consumer.

"**Water Supply System**" means the structures, equipment and appurtenances for collection, treatment, storage and distribution of potable water from the source of supply to the free-flowing outlet of the ultimate consumer.

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

3.0 Source and Protection

3.1 Water Source Desirability. Drinking water shall be obtained from the most desirable source which is feasible, and efforts must be made to prevent or control pollution of the source. If the source fails to meet the bacteriological standards of Section 7.0 and is not already disinfecting pursuant to subsection 1.19.1, it may be required to do so in order to meet the bacteriological standards.

3.2 Sanitary Surveys: Sanitary surveys shall be made by the Division in order to locate and identify health hazards which might exist in the water supply system. The manner and frequency of making these surveys, and the rate at which discovered health hazards are to be removed, shall be in accordance with a program approved by the Division.

3.2.1 Water systems must correct any major sanitary defects noted during a sanitary survey as soon as possible but no later than 120 days after being notified by the Division. If the corrections will take longer than 120 days to complete then a corrective action plan with a timetable must be submitted to the Office of Drinking Water.

3.2.2 Public water systems which do not collect five or more routine samples per month must undergo an initial sanitary survey by June 29, 1994, for community water systems and June 29, 1999, for non-community water systems. Thereafter, systems must undergo another sanitary survey every three years, except that non-community water systems using only protected ground water, as defined by the Division, must undergo subsequent sanitary surveys at least every five years after the initial sanitary survey. The Division must review the results of each sanitary survey to determine whether the existing monitoring frequency is adequate and what additional measures, if any, the system needs to undertake to improve drinking water quality.

3.2.3 In conducting a sanitary survey of a system using ground water in a State having an EPA-approved wellhead protection program under section 1428 of the Safe Drinking Water Act, information on sources of contamination within the delineated wellhead protection area that was collected in the course of

developing and implementing the program should be considered instead of collecting new information, if the information was collected since the last time the system was subject to a sanitary survey.

3.2.4 Sanitary surveys must be performed by the Division or an agent approved by the Division. The system is responsible for ensuring the survey takes place.

3.2.5 Sanitary surveys conducted by the Division under provisions of subsection 8.2 may be used to meet the sanitary survey requirements of this section.

3.3 Protection of Water. Water delivered to every consumer by any public water supplier shall be so protected by natural means, by proper constructions or by treatment so as to consistently equal or exceed the requirements herein established.

3.4 Monitoring Water Quality. Quality of water delivered by any public water supplier shall be continuously and/or periodically monitored in accordance with requirements herein established or in accordance with such monitoring plan of equal or greater effect as may be proposed by a public water supplier for its own use, subject to Division approval.

3.5 Responsibility. For the purpose of application of these Regulations, the supplier of water shall be responsible for the water quality at the user's free flowing outlet except for turbidity, inorganic compounds, radionuclides, SOCs, and VOCs, which are measured at a representative entry point(s) to the water distribution system.

3.6 Certified Operator. A water supply system shall be operated under the direct responsible charge of personnel whose qualifications meet the certification requirements of the “State of Delaware Regulations for the Licensing and Registration of Operators of Public Water Supply Systems.”

3.7 Approved Sampler/Tester:

3.7.1 An approved sampler/tester is approved for conducting routine water sampling and water quality analyses for chlorine residual, pH, nitrate testing or water quality parameter testing and entering that information into a log book. The approved sampler/tester is not a fully licensed operator and must work under the direction of a licensed operator. The approved sampler/tester must attend an approved course and pass a test approved by the Division. Individuals collecting samples under the tap water monitoring provisions of the lead/copper rule are exempted from this requirement.

3.7.2 Approved sampler/tester certification shall be valid for three years. An individual must attend a class approved by the Division and pass a test in order to receive certification. Attendance at an approved class and passing the test is required for renewal of the certification.

4.0 Reporting and Public Notification

4.1 Reporting

4.1.1 Results of Test, Measurement or Analysis: Except where a shorter period is specified in this part, the supplier of water shall report to the Division on forms approved by the Division the results of any test, measurement or analysis required by this part within:

4.1.1.1 The first ten (10) days following the month in which the result is received, or

4.1.1.2 The first ten (10) days following the end of the required monitoring period as stipulated by the Division, whichever of these is shortest.

4.1.1.3 Daily testing for free available chlorine residual, nitrates, pH, fluoride or other chemicals as determined by the Division is required for systems that provide treatment (addition, removal or adjustment) unless another schedule is agreed to in writing by the Division.

4.1.2 Failure to comply with a PMCL: Unless otherwise stipulated, the supplier of water shall report to the Division within twenty-four (24) hours the failure to comply with any Primary Drinking Water Regulations (including failure to comply with monitoring requirements).

4.1.3 Analysis Performed by Division of Public Health Laboratory: The supplier of water is not required to report analytical results to the Division in cases where an approved laboratory performs the analyses and reports the results directly to the Division.

4.1.4 Reporting of Unregulated Contaminants: The owner of a CWS or NTNCWS who is required to monitor under 40 CFR 141.40, shall send a copy of the results of such monitoring to the Division within thirty (30) days of receipt and any public notice issued under subsection 4.2.6 to the Division.

4.1.5 Reporting by Surface Water Systems: A PWS that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment must report monthly to the Division the information specified in this paragraph, beginning June 29, 1993.

4.1.5.1 Turbidity measurements must be reported within ten (10) days after the end of each month the system serves water to the public. Information that must be reported includes:

4.1.5.1.1 The total number of filtered water turbidity measurements taken during the month.

4.1.5.1.2 The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits for the filtration technology being used.

4.1.5.1.3 The date and value of any turbidity measurements taken during the month which exceed one (1) NTU.

4.1.5.2 Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, must report that occurrence to the Division as soon as possible, but no later than by the end of the next business day. If at any time the turbidity exceeds one (1) NTU, the system must inform the Division as soon as possible, but no later than the end of the next business day. If at any time the free available chlorine residual falls below 0.3 mg/L in the water entering the distribution system, the system must notify the Division as soon as possible, but no later than by the end of the next business day. The system must also notify the Division by the end of the next business day whether or not the free available chlorine residual was restored to at least 0.3 mg/L within four (4) hours.

4.1.6 Reporting of Chemical Overfeed Incidents or Unusual Events: It is the responsibility of the owner and/or the operator of a Public Water System to report to the Division, within 24 hours, any incidents of chemical overfeed and/or unusual events.

4.1.6.1 Examples of unusual events include but are not limited to the following:

- Loss of pressure
- Well pump failure
- Main break with associated loss of pressure
- Loss of disinfectant or other treatment failure
- Acts of vandalism
- Discovery of malicious intent

4.1.7 Certification requirements: The public water system, within 10 days of completing the public notification requirements under subsection 4.2 of these regulations for the initial public notice and any repeat notices, must submit to the Division a certification that it has fully complied with the public notification requirements. The public water system must include with this certification a representative copy of each type of notice distributed, published, posted and made available to the persons served by the system and to the media.

4.1.8 Submission to the Division: The water supply system shall submit to the Division within the time stated in the request copies of any records required to be maintained under subsection 4.4 hereof or copies of any documents then in existence that the Division or the Administrator of the US Environmental Protection Agency is entitled to inspect pursuant to the authority of section 1445 of the Safe drinking Water Act or the equivalent provisions of the Delaware Code.

4.1.9 General Requirements

4.1.9.1 Each owner or operator of a public water system (community water systems, non-transient non-community water systems, and transient non-community water systems) must give notice for all violations of national primary drinking water regulations (NPDWR) and for other situations, as listed in subsection 4.1.9.1.1. The term "NPDWR violations" is used in this subpart to include violations of the maximum contaminant level (MCL), maximum residual disinfection level (MRDL), treatment technique (TT), monitoring requirements, and testing procedures in this part 141. Appendix A to this subpart identifies the tier assignment for each specific violation or situation requiring a public notice.

4.1.9.1.1 Violation categories and other situations requiring a public notice.

4.1.9.1.1.1 NPDWR violations:

4.1.9.1.1.1.1 Failure to comply with an applicable maximum contaminant level (MCL) or maximum residual disinfectant level (MRDL).

4.1.9.1.1.1.2 Failure to comply with a prescribed treatment technique (TT).

4.1.9.1.1.1.3 Failure to perform water quality monitoring, as required by the drinking water regulations.

4.1.9.1.1.1.4 Failure to comply with testing procedures as prescribed by a drinking water regulation.

4.1.9.1.1.2 Special public notices:

4.1.9.1.1.2.1 Occurrence of a waterborne disease outbreak or other waterborne emergency.

4.1.9.1.1.2.2 Exceedance of the nitrate MCL by non-community water systems (NCWS), where granted permission by the primacy agency under subsection 9.1.13.

4.1.9.1.1.2.3 Availability of unregulated contaminant monitoring data.

4.1.9.1.1.2.4 Other violations and situations determined by the primacy agency to require a public notice not already listed in subsection 4.2.3.

4.1.9.2 Public notice requirements are divided into three tiers, to take into account the seriousness of the violation or situation and of any potential adverse health effects that may be involved. The public notice requirements for each violation or situation listed in subsection 4.1.9.1.1 are determined by the tier to which it is assigned. Subsection 4.2.3 identifies the tier assignment for each specific violation or situation.

4.1.9.3 Each public water system must provide public notice to persons served by the water system, in accordance with this section.

4.1.9.3.1 Public water systems that sell or otherwise provide drinking water to other public water systems (i.e., to consecutive systems) are required to give public notice to the owner or operator of the consecutive system; the consecutive system is responsible for providing public notice to the persons it serves.

4.1.9.3.2 If a public water system has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, the primacy agency may allow the system to limit distribution of the public notice to only persons served by that portion of the system which is out of compliance. Permission by the primacy agency for limiting distribution of the notice must be granted in writing.

4.1.9.3.3 A copy of the notice must also be sent to the primacy agency, in accordance with the requirements under subsection 4.2.1.1.4.

4.2 Public Notification

4.2.1 General Public Notice Requirements:

4.2.1.1 It shall be the duty and responsibility of a water supply owner to give public notice in accordance with the following requirements:

4.2.1.1.1 Tier 1 Public Notice: Form, manner, and frequency of notice.

4.2.1.1.1.1 Violation categories and other situations requiring a Tier 1 public notice. Subsection 4.2.3 identifies the tier assignment for each specific violation or situation.

4.2.1.1.1.1.1 Violation of the MCL for total coliforms when fecal coliform or E. coli are present in the water distribution system (as specified in subsection 7.2), or when the water system fails to test for fecal coliforms or E. coli when any repeat sample tests positive for coliform (as specified in subsection 7.2);

4.2.1.1.1.1.2 Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, as defined in subsection 9.1, or when the water system fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate or nitrite MCL, as specified in subsection 9.1.8.2 or violation of twice the MCL for fluoride as defined in subsection 9.1;

4.2.1.1.1.1.3 Exceedance of the nitrate MCL by non-community water systems, where permitted to exceed the MCL by the Division under subsection 9.1.13;

4.2.1.1.1.1.4 Violation of the MRDL for chlorine dioxide, as defined in subsection 12.3.1, when one or more samples taken in the distribution system the day following an exceedance of the MRDL at the entrance of the distribution system exceed the MRDL, or when the water system does not take the required samples in the distribution system, as specified in subsection 13.7;

4.2.1.1.1.1.5 Violation of the turbidity MCL under subsection 11.1.1, where the Division determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;

4.2.1.1.1.1.6 Violation of the Surface Water Treatment Rule (SWTR)(Section 17.0), Interim Enhanced Surface Water Treatment Rule (IESWTR) (Section 18.0) or the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) (Section 20.0) treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit (as identified in subsection 4.2.3), where the Division determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;

4.2.1.1.1.1.7 Occurrence of a waterborne disease outbreak, as defined in Section 2.0, or other waterborne emergency (such as a failure or significant interruption in key water treatment processes, a natural disaster that disrupts the water supply or distribution system, or a

chemical spill or unexpected loading of possible pathogens into the source water that significantly increases the potential for drinking water contamination);

4.2.1.1.1.1.8 Detection of E. coli, enterococci, or coliphage in source water samples as specified in subsections 8.3.1 and 8.3.2;

4.2.1.1.1.1.9 Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the Division either in these regulations or on a case-by-case basis.

4.2.1.1.1.2 Public water systems must:

4.2.1.1.1.2.1 Provide a public notice as soon as practical but no later than 24 hours after the system learns of the violation;

4.2.1.1.1.2.2 Initiate consultation with the Division as soon as practical, but no later than 24 hours after the public water system learns of the violation or situation, to determine additional public notice requirements; and

4.2.1.1.1.2.3 Comply with any additional public notification requirements (including any repeat notices or direction on the duration of the posted notices) that are established as a result of the consultation with the Division. Such requirements may include the timing, form, manner, frequency, and content of repeat notices (if any) and other actions designed to reach all persons served.

4.2.1.1.1.3 Public water systems must provide the notice within 24 hours in a form and manner reasonably calculated to reach all persons served. The form and manner used by the public water system are to fit the specific situation, but must be designed to reach residential, transient, and non-transient users of the water system. In order to reach all persons served, water systems are to use, at a minimum, one or more of the following forms of delivery:

4.2.1.1.1.3.1 Appropriate broadcast media (such as radio and television);

4.2.1.1.1.3.2 Posting of the notice in conspicuous locations throughout the area served by the water system;

4.2.1.1.1.3.3 Hand delivery of the notice to persons served by the water system; or

4.2.1.1.1.3.4 Another delivery method approved in writing by the Division.

4.2.1.1.2 Tier 2 Public Notice: Form, manner and frequency of notice

4.2.1.1.2.1 Violation categories and other situations requiring a Tier 2 public notice. Subsection 4.2.3 identifies the tier assignment for each specific violation or situation.

4.2.1.1.2.1.1 All violations of the MCL, MRDL, Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR), the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), the Long Term 2 ESWTR, Lead and Copper Rule (LCR), Disinfectant/Disinfection Byproduct Rules (DBPRs), and the Ground Water Rule (GWR) treatment technique requirements, except where a Tier 1 notice is required under subsection 4.1.1.1 or where the Division determines that a Tier 1 notice is required;

4.2.1.1.2.1.2 Violations of the monitoring and testing procedure requirements, where the Division determines that a Tier 2 rather than a Tier 3 public notice is required, taking into account potential health impacts and persistence of the violation;

4.2.1.1.2.1.3 Special notice for repeated failure to conduct monitoring of the source water for Cryptosporidium and for failure to determine bin classification or mean Cryptosporidium level.

4.2.1.1.2.1.3.1 The owner or operator of a community or non-community water system that is required to monitor source water under subsection 21.2 must notify persons served by the water system that monitoring has not been completed as specified no later than **[~~30~~ 14]** days after the system has failed to collect any 3 months of monitoring as specified in subsection 21.2.3. The notice must be repeated as specified in subsection 4.2.1.1.2.2.1.

4.2.1.1.2.1.3.2 The owner or operator of a community or non-community water system that is required to determine a bin classification under subsection 21.11, or to determine mean Cryptosporidium level under subsection 21.13, must notify persons served by the water system that the determination has not been made as required no later than **[~~30~~ 14]** days after the system has failed to report the determination as specified in subsection 21.11.5 or subsection 21.13.1, respectively. The notice must be repeated as specified in subsection 4.2.1.1.2.2.1. The notice is not required if the system is complying with a Division-approved schedule to address the violation.

4.2.1.1.2.1.3.3 The form and manner of the public notice must follow the requirements for a Tier 2 public notice prescribed in subsection 4.2.1.1.2. The public notice must be presented as required in subsection 4.2.2.3.1.

4.2.1.1.2.1.3.4 The notice must contain the following language, including the language necessary to fill in the blanks.

4.2.1.1.2.1.3.4.1 The special notice for repeated failure to conduct monitoring must contain the following language:

We are required to monitor the source of your drinking water for Cryptosporidium. Results of the monitoring are to be used to determine whether water treatment at the (treatment plant name) is sufficient to adequately remove Cryptosporidium from your drinking water. We are required to complete this monitoring and make this determination by (required bin determination date). We ``did not monitor or test'' or ``did not complete all monitoring or testing'' on schedule and, therefore, we may not be able to determine by the required date what treatment modifications, if any, must be made to ensure adequate Cryptosporidium removal. Missing this deadline may, in turn, jeopardize our ability to have the required treatment modifications, if any, completed by the deadline required, (date).

For more information, please call (name of water system contact) of (name of water system) at (phone number).

4.2.1.1.2.1.3.4.2 The special notice for failure to determine bin classification or mean Cryptosporidium level must contain the following language:

We are required to monitor the source of your drinking water for Cryptosporidium in order to determine by (date) whether water treatment at the (treatment plant name) is sufficient to adequately remove Cryptosporidium from your drinking water. We have not made this determination by the required date. Our failure to do this may jeopardize our ability to have the required treatment modifications, if any, completed by the required deadline of (date). For more information, please call (name of water system contact) of (name of water system) at (phone number).

4.2.1.1.2.1.3.4.3 Each special notice must also include a description of what the system is doing to correct the violation and when the system expects to return to compliance or resolve the situation.

4.2.1.1.2.1.4 Failure to take corrective action or failure to maintain at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer under subsection 8.4.1.

4.2.1.1.2.1.5 Other violations or situations with significant potential to have adverse effects on human health as a result of exposure, as determined by the Division either in these regulations or on a case-by-case basis.

4.2.1.1.2.2 Public water systems must:

4.2.1.1.2.2.1 Public water systems must provide the public notice as soon as practical, but no later than 14 days after the system learns of the violation. If the public notice is posted, the notice must remain in place for as long as the violation or situation persists, but in no case for less than seven days, even if the violation or situation is resolved.

4.2.1.1.2.2.2 The public water system must repeat the notice every three months as long as the violation or situation persists, unless the Division determines that appropriate circumstances warrant a different repeat notice frequency. In no circumstance may the repeat notice be given less frequently than once per year. It is not appropriate for the Division to allow less frequent repeat notice for an MCL violation or treatment technique violation under the Total Coliform Rule or subsection 7.4 or a treatment technique violation under the Surface Water Rule or Interim Enhanced Surface Water Treatment rule. It is also not appropriate for the Division to allow through its rules or its policies across-the-board reductions in the repeat notice frequency for other ongoing violation requiring a Tier 2 repeat notice. Division determinations allowing repeat notices to be given less frequently than once every three months must be in writing.

4.2.1.1.2.2.3 For the turbidity violations specified in this paragraph, public water systems must consult with the Division as soon as practical but no later than 24 hours after the public water system learns of the violation, to determine whether a Tier 1 public notice under subsection 4.1.1.1 is required to protect public health. When consultation does not take place within the 24-hour period, the water system must distribute a Tier 1 notice of the

violation within the next 24 hours (i.e., no later than 48 hours after the system learns of the violation), following the requirements under subsections 4.1.1.2 and 4.1.1.3. Consultation with the Division is required for:

4.2.1.1.2.2.3.1 Violation of the turbidity MCL under subsection 7.1.1; or

4.2.1.1.2.2.3.2 Violation of the SWTR, IESWTR or LT1ESWTR treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit.

4.2.1.1.2.2.3.3 Public water systems must provide the initial public notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

4.2.1.1.2.2.3.3.1 Unless directed otherwise by the Division in writing, community water systems must provide notice by:

4.2.1.1.2.2.3.3.1.1 Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

4.2.1.1.2.2.3.3.1.2 Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in subsection 4.2.1.3.1.1. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: Publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places served by the system or on the Internet; or delivery to community organizations.

4.2.1.1.2.2.3.3.2 Unless directed otherwise by the Division in writing, non-community water systems must provide notice by:

4.2.1.1.2.2.3.3.2.1 Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

4.2.1.1.2.2.3.3.2.2 Any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice required in subsection 4.2.1.1.3.2.1. Such persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. Other methods may include: Publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (e.g., community centers).

4.2.1.1.3 Tier 3 Public Notice: Form, manner, and frequency of notice

4.2.1.1.3.1 Violation categories and other situations requiring a Tier 3 public notice. Subsection 4.2.3 identifies the tier assignment for each specific violation or situation.

4.2.1.1.3.1.1 Monitoring violations under 40 CFR part 141, except where a Tier 1 notice is required under subsection 4.2.1.1 or where the Division determines that a Tier 2 notice is required;

4.2.1.1.3.1.2 Failure to comply with a testing procedure established in 40 CFR part 141, except where a Tier 1 notice is required under subsection 4.2.1.1 or where the Division determines that a Tier 2 notice is required;

4.2.1.1.3.1.3 Failure to comply with subsection 3.6 of these regulations;

4.2.1.1.3.1.4 Availability of unregulated contaminant monitoring results, as required under subsection 4.2.6; and

4.2.1.1.3.1.5 Other violations or situations with significant potential to have adverse effects on human health as a result of exposure, as determined by the Division either in these regulations or on a case-by-case basis.

4.2.1.1.3.1.6 Reporting and recordkeeping violations under subsection 7.4.

4.2.1.1.3.2 Public water systems must:

4.2.1.1.3.2.1 Public water systems must provide the public notice not later than 90 days after the public water system learns of the violation or situation. Following the initial notice, the public water system must repeat the notice annually for as long as the violation or other situation persists. If the public notice is posted, the notice must remain in place for as long

as the violation or other situation persists, but in no case less than seven days (even if the violation or situation is resolved).

4.2.1.1.3.3 Public water systems must provide the initial notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it must at a minimum meet the following requirements:

4.2.1.1.3.3.1 Unless directed otherwise by the Division in writing, community water systems must provide notice by:

4.2.1.1.3.3.1.1 Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

4.2.1.1.3.3.1.2 Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in subsection 4.2.1.1.3.1.1. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). Other methods may include: Publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places or on the Internet; or delivery to community organizations.

4.2.1.1.3.3.2 Unless directed otherwise by the Division in writing, non-community water systems must provide notice by:

4.2.1.1.3.3.2.1 Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

4.2.1.1.3.3.2.2 Any other method reasonably calculated to reach other persons served by the system, if they would not normally be reached by the notice required in subsection 4.2.1.1.3.3.2.1. Such persons may include those who may not see a posted notice because the notice is not in a location they routinely pass by. Other methods may include: Publication in a local newspaper or newsletter distributed to customers; use of E-mail to notify employees or students; or, delivery of multiple copies in central locations (e.g., community centers).

4.2.1.1.4 Certification to the Division: The owner of a public water system, within ten (10) days of completing the public notice requirements of this section for the initial public notice and any repeat notices, shall submit to the Division a completed Delivery Certification Form, certifying when and how the public notice was delivered and that they have complied with the public notice regulations. The owner shall include with this certification a copy, as delivered, of each type of notice distributed, published, posted, and made available to the persons served by the system and to the media.

4.2.1.1.5 The Division may, at their discretion, 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.

4.2.2 Content of a Public Notice

4.2.2.1 When a public water system violates a NPDWR or has a situation requiring public notification, each public notice must include the following elements:

4.2.2.1.1 A description of the violation or situation, including the contaminant(s) of concern, and (as applicable) the contaminant level(s);

4.2.2.1.2 When the violation or situation occurred;

4.2.2.1.3 Any potential adverse health effects from the violation or situation, including the standard language under subsections 4.2.2.4.1 or 4.2.2.4.2, whichever is applicable;

4.2.2.1.4 The population at risk, including subpopulations particularly vulnerable if exposed to the contaminant in their drinking water;

4.2.2.1.5 Whether alternative water supplies should be used;

4.2.2.1.6 What actions consumers should take, including when they should seek medical help, if known;

4.2.2.1.7 What the system is doing to correct the violation or situation;

4.2.2.1.8 When the water system expects to return to compliance or resolve the situation;

4.2.2.1.9 The name, business address, and phone number of the water system owner, operator, or designee of the public water system as a source of additional information concerning the notice; and

4.2.2.1.10 A statement to encourage the notice recipient to distribute the public notice to other persons served, using the standard language under subsection 4.2.2.**[43]**.3, where applicable.

4.2.2.2 The public notice shall:

4.2.2.2.1 Each public notice required by this section:

4.2.2.2.1.1 Must be displayed in a conspicuous way when printed or posted;

4.2.2.2.1.2 Must not contain overly technical language or very small print;

4.2.2.2.1.3 Must not be formatted in a way that defeats the purpose of the notice;

4.2.2.2.1.4 Must not contain language which nullifies the purpose of the notice.

4.2.2.2.2 Each public notice required by this section must comply with multilingual requirements, as follows:

4.2.2.2.2.1 For public water systems serving a large proportion of non-English speaking consumers, as determined by the Division, the public notice must contain information in the appropriate language(s) regarding the importance of the notice or contain a telephone number or address where persons served may contact the water system to obtain a translated copy of the notice or to request assistance in the appropriate language.

4.2.2.2.2.2 In cases where the Division has not determined what constitutes a large proportion of non-English speaking consumers, the public water system must include in the public notice the same information as in subsection 4.2.2.2.2.1, where appropriate to reach a large proportion of non-English speaking persons served by the water system.

4.2.2.3 Public water systems are required to include the following standard language in their public notice:

4.2.2.3.1 Standard health effects language for MCL or MRDL violations, and treatment technique violations. Public water systems must include in each public notice the health effects language specified in subsection 4.2.2.5 corresponding to each MCL, MRDL, and treatment technique violation listed in subsection 4.2.2.

4.2.2.3.2 Standard language for monitoring and testing procedure violations. Public water systems must include the following language in their notice, including the language necessary to fill in the blanks, for all monitoring and testing procedure violations listed in subsection 4.2.2:

"We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During [compliance period], we "did not monitor or test" or "did not complete all monitoring or testing" for [contaminant(s)], and therefore cannot be sure of the quality of your drinking water during that time."

4.2.2.3.3 Standard language to encourage the distribution of the public notice to all persons served. Public water systems must include in their notice the following language (where applicable):

"Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail."

4.2.2.4 Mandatory Health Effects Language:

4.2.2.4.1 When providing the information on potential adverse health effects required by subsection 4.2.2.3.1 in notices of violations of MCLs or treatment technique requirements the owner of a PWS must include the following mandatory language specific to each contaminant:

4.2.2.4.1.1 Microbiological Contaminants:

4.2.2.4.1.1.1 Total Coliforms: Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.

4.2.2.4.1.1.2 Fecal Coliforms/E. coli: Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly and people with severely compromised immune systems.

4.2.2.4.1.1.3 Fecal indicators (enterococci or coliphage): Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

4.2.2.4.1.1.4 Total organic carbon (TOC): 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.

4.2.2.4.1.1.5 Turbidity: 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.

4.2.2.4.1.1.6 Giardia lamblia, Viruses, Heterotrophic plate count (HPC) bacteria, Legionella, and Cryptosporidium: 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. The language in this paragraph shall be used for any violation of the following rules: the Surface Water Treatment Rule; The Interim Enhanced Surface Water Treatment Rule; The Filter Backwash Recycling Rule; and, the Long Term 1 Enhanced Surface Water Treatment Rule.

4.2.2.4.1.2 Inorganic Contaminants:

- Antimony: Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
- Arsenic: Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.
- Asbestos: Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.
- Barium: Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
- Beryllium: Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.
- Cadmium: Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.
- Chromium: Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.
- Copper: 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.
- Cyanide: 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.
- Lead: 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.
- Mercury (inorganic): Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.
- Nickel: Some people who drink water containing nickel well in excess of the MCL over many years could experience heart and liver damage.

- Nitrate: Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.
- Nitrite: Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.
- Selenium: Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.
- Thallium: 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.

4.2.2.4.1.3 Synthetic Organic Compounds

- 2,4-D: 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.
- 2,4,5-TP [Silvex]: Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.
- Acrylamide: Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.
- Alachlor: Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.
- Atrazine. Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.
- Benzo(a)pyrene (PAH). Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
- Carbofuran: Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.
- Chlordane: Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.
- Dalapon: Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.
- Di(2-ethylhexyl)adipate: 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.
- Di(2-ethylhexyl)phthalate: 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.
- Dibromochloropropane (DBCP): 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.
- Dinoseb: Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
- Diquat: Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.
- Dioxin (2,3,7,8-TCDD): 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.
- Endothall: Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.
- Endrin: Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.

- Epichlorohydrin: Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.
- Ethylene dibromide (EDB): Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.
- Glyphosate: Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.
- Heptachlor: Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.
- Heptachlor Epoxide: Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.
- Hexachlorobenzene: Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.
- Hexachlorocyclopentadiene: Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.
- Lindane: Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.
- Methoxychlor: Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
- Oxamyl [Vydate]: Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.
- PCBs [Polychlorinated Biphenyls]: 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.
- Pentachlorophenol: Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.
- Picloram: Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.
- Simazine: Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.
- Toxaphene: 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.

4.2.2.4.1.4 Volatile Organic Compounds:

- Benzene: Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.
- Carbon Tetrachloride: Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
- Chlorobenzene [Monochlorobenzene]: Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.
- o-Dichlorobenzene: Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.
- p-Dichlorobenzene: Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.

- 1,2-Dichloroethane: Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
- 1,1-Dichloroethylene:Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
- Cis-1,2-Dichloroethylene: Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
- Trans-1,2-Dichloroethylene: Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.
- Dichloromethane: Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.
- 1,2-Dichloropropane: Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
- Ethylbenzene: Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
- Methyl [tert] Butyl Ether (MTBE): Some people who drink water containing MTBE in excess of the MCL over many years may experience problems of the central nervous system, including loss of muscle coordination, tremors, difficulty breathing, and drowsiness.
- Styrene: Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.
- Tetrachloroethylene: Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.
- 1,2,4-Trichlorobenzene: Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.
- 1,1,1-Trichloroethane: Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.
- 1,1,2-Trichloroethane: Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.
- Trichloroethylene: 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.
- Toluene: Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.
- Vinyl Chloride: Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
- Xylenes: Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.

4.2.2.4.1.5 Radiological Compounds

- Beta/photon emitters: 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.
- Alpha emitters: Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
- Combined Radium 226/228: Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
- Uranium: 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.

4.2.2.4.1.6 Disinfection/Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfection Residuals: Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs).

- Chlorine: 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.
- Chloramines: Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.
- Chlorine dioxide, where any two consecutive daily samples taken at the entrance to the distribution system are above the 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.
- Chlorine dioxide, where one or more distribution system samples are above the 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 exposure to chlorine dioxide-treated water.
- Disinfection byproducts and treatment technique for DBPs: The United States Environmental Protection Agency (EPA) sets drinking water standards and requires the disinfection of drinking water. However, when used in the treatment of drinking water, disinfectants react with naturally-occurring organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA has determined that a number of DBPs are a health concern at certain levels of exposure. Certain DBPs, including some trihalomethanes (THMs) and some haloacetic acids (HAAs), have been shown to cause cancer in laboratory animals. Other DBPs have been shown to affect the liver and the nervous system, and cause reproductive or developmental effects in laboratory animals. Exposure to certain DBPs may produce similar effects in people. EPA has set standards to limit exposure to THMs, HAAs, and other DBPs.
- Bromate: Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.
- Chlorite: 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.
- Haloacetic Acids (HAA): Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.
- TTHMs [Total Trihalomethanes]: 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.

4.2.2.4.1.7 Public Notification for Fluoride: Notice of violations of the MCL for fluoride shall consist of the public notice prescribed in this section, plus a description of any steps which the system is taking to come into compliance. The public notice must contain the following language:

4.2.2.4.1.7.1 Drinking water containing fluoride in excess of the MCL over many years may cause mottling of children's teeth, usually in children less than nine years old. Mottling, also known as dental fluorosis, may include brown staining and/or pitting of the teeth, and occurs only in developing teeth before they erupt from the gums. Fluoride in drinking water at twice the MCL may cause bone disease, including pain and tenderness of the bones.

4.2.2.4.1.7.2 For more information, please call [name of water system contact] of [name of community water system] at [phone number]. Some home water treatment units are also available to remove fluoride from drinking water. To learn more about available home water treatment units, you may call NSF International at 1-877-8-NSF-HELP."

4.2.2.5 Public Notification by the State: The Division may give notice to the public required by this section on behalf of the owner of a public water system if the Division complies with the requirements of this section. However, the owner of the public water system remains legally responsible for ensuring that the requirements of this section are met.

4.2.2.6 Record Maintenance: Copies of public notices issued pursuant to subsection 4.2.2 of this part and certifications made to the Division pursuant to subsection 4.2.1.1.4 must be kept for five (5) years after issuance.

4.2.3 Frequency, Tier Designation and Distribution of Public Notification:

4.2.3.1 NPDWR Violations and Other Situations Requiring Public Notice1: Public notices shall be provided in accordance with the requirements of subsections 4.2.1, 4.2.2 and the following table:

Contaminant	**MCL/MRDL/TT violations[2]**		**Monitoring and Testing Procedure violations**	
	Tier of Public Notice Required	**Citation**	**Tier of Public Notice Required**	**Citation**
1. Violations of National Primary Drinking Water Regulations (NPDWR)[3]				
A. Microbiological Contaminants				
1. Total coliform	2	7.0	3	7.0
2. Fecal coliform/E. coli	1	7.0	[4]1,3	7.0
3. Turbidity MCL	2	16.4	3	16.5
4. Turbidity MCL (average of 2 days samples >5 NTU)	[5]2,1	16.4	3	16.5
5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level)	[6]2,1	16.4	3	16.5
6. Surface Water Treatment rule violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT)	2	16.0	3	16.0
7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT)	[7]2	17.0	3	17.0
8. Filter Backwash Recycling Rule violations.	2	18.0	3	18.0

9. Long Term 1 Enhanced Surface Water Treatment Rule violations]	2	19.0	3	19.0
10. Long Term 2 Enhanced Surface water Treatment Rule violations	2	20.0	[22]2,3	20.2-20.6 and 20.9-20.10
11.Ground Water Rule Violations	2	8.0	3	8.4.2
B. Inorganic Chemicals (IOCs)				
1. Antimony	2	9.1	3	9.1.2
2. Arsenic	2	[8]9.1	3	[11]9.1.2
3. Asbestos(fibers >10 microns)	2	9.1	3	9.1.2
4. Barium	2	9.1	3	9.1.2
5. Beryllium	2	9.1	3	9.1.2
6. Cadmium	2	9.1	3	9.1.2
7. Chromium (Total)	2	9.1	3	9.1.2
8. Cyanide	2	9.1	3	9.1.2
9. Fluoride	1,2	9.1	3	9.1.2
10. Mercury (inorganic)	2	9.1	3	9.1.2
11. Nickel	2	9.1	3	9.1.2
12. Nitrate	1	9.1	[12]1,3	9.1.2
13. Nitrite	1	9.1	[12]1,3	9.1.2
14. Total Nitrate and Nitrite	1	9.1	3	9.1.2
15. Selenium	2	9.1	3	9.1.2
16. Thallium	2	9.1	3	9.1.2
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	10.0	3	10.0
D. Synthetic Organic Chemicals (SOCs)				
1. 2,4 - D	2	9.2.1.1	3	9.2.2
2. 2,4,5 –TP	2	9.2.1.1	3	9.2.2
3. Alachlor	2	9.2.1.1	3	9.2.2
4. Atrazine	2	9.2.1.1	3	9.2.2
5. Benzo(a)pyrene (PAHs)	2	9.2.1.1	3	9.2.2
6. Carbofuran	2	9.2.1.1	3	9.2.2
7. Chlordane	2	9.2.1.1	3	9.2.2
8. Dalapon	2	9.2.1.1	3	9.2.2
9. Di (2-ethylhexyl) adipate	2	9.2.1.1	3	9.2.2
10. Di (2-ethylhexyl) phthalate	2	9.2.1.1	3	9.2.2
11. Dibromochloropropane	2	9.2.1.1	3	9.2.2
12. Dinoseb	2	9.2.1.1	3	9.2.2
13. Dioxin (2,3,7,8 – TCDD)	2	9.2.1.1	3	9.2.2
14. Diquat	2	9.2.1.1	3	9.2.2
15. Endothall	2	9.2.1.1	3	9.2.2
16. Endrin	2	9.2.1.1	3	9.2.2
17. Ethylene Dibromide	2	9.2.1.1	3	9.2.2
18. Glyphosate	2	9.2.1.1	3	9.2.2
19. Heptachlor	2	9.2.1.1	3	9.2.2
20. Heptachlor epoxide	2	9.2.1.1	3	9.2.2
21. Hexachlorobenzene	2	9.2.1.1	3	9.2.2

22. Hexachlorocyclopentadiene	2	9.2.1.1	3	9.2.2
23. Lindane	2	9.2.1.1	3	9.2.2
24. Methoxychlor	2	9.2.1.1	3	9.2.2
25. Oxamyl (Vydate)	2	9.2.1.1	3	9.2.2
26. Pentachlorophenol	2	9.2.1.1	3	9.2.2
27. Picloram	2	9.2.1.1	3	9.2.2
28. Polychlorinated biphenyls (PCBs)	2	9.2.1.1	3	9.2.2
29. Simazine	2	9.2.1.1	3	9.2.2
30. Toxaphene	2	9.2.1.1	3	9.2.2
E. Volatile Organic Chemicals (VOCs)				
1. Benzene	2	9.2.1.3	3	9.2.2
2. Carbon tetrachloride	2	9.2.1.3	3	9.2.2
3. Chlorobenzene (monochlorobenzene)	2	9.2.1.3	3	9.2.2
4. o-Dichlorobenzene	2	9.2.1.3	3	9.2.2
5. p-Dichlorobenzene	2	9.2.1.3	3	9.2.2
6. 1,2-Dichloroethane	2	9.2.1.3	3	9.2.2
7. 1,1-Dichloroethylene	2	9.2.1.3	3	9.2.2
8. cis-1,2,-Dichloroethylene	2	9.2.1.3	3	9.2.2
9. trans-1,2-Dichloroethylene	2	9.2.1.3	3	9.2.2
10. Dichloromethane	2	9.2.1.3	3	9.2.2
11. 1,2-Dichloropropane	2	9.2.1.3	3	9.2.2
12. Ethylbenzene	2	9.2.1.3	3	9.2.2
13. Styrene	2	9.2.1.3	3	9.2.2
14. Tetrachloroethylene	2	9.2.1.3	3	9.2.2
15. Toluene	2	9.2.1.3	3	9.2.2
16. 1,2,4-Trichlorobenzene	2	9.2.1.3	3	9.2.2
17. 1,1,1-Trichloroethane	2	9.2.1.3	3	9.2.2
18. 1,1,2-Trichloroethane	2	9.2.1.3	3	9.2.2
19. Trichloroethylene	2	9.2.1.3	3	9.2.2
20. Vinyl chloride	2	9.2.1.3	3	9.2.2
21. Xylenes (total)	2	9.2.1.3	3	9.2.2
22. Methyl tert Butyl Ether	2	9.2.1.3	3	9.2.2
F. Radioactive Contaminants				
1. Beta/photon emitters	2	16.1.1.4	3	16.2
2. Alpha emitters	2	16.1.1.3	3	16.2
3. Combined radium (226 & 228)	2	16.1.1.2	3	16.2
4. Uranium	[9]2	16.1.1.5	[10]3	16.2
G. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfection Residuals.[13]				
1. Total trihalomethanes (TTHMs)	2	[14]9.2.1.2 **[9.2.2.2.1.11, 9.3.1.1]**	3	**[~~9.2.3~~ 12.6.1 to 12.6.5, 12.7.1 to 12.7.3, 13.0 to 13.6, 14.0 to 14.9]**

2. Haloacetic Acids (HAA5)	2	9.2.1.2**[, 9.2.2.2.1.11, 9.3.1.1]**	3	**[~~9.2.3~~ 12.6.1 to 12.6.5, 12.7.1 to 12.7.3, 13.0 to 13.6, 14.0 to 14.9]**
3. Bromate	2	9.2.1.2**[, 9.2.2.2.1.11]**	3	**[~~9.2.3~~ 12.6.1 to 12.6.5, 12.7.1 to 12.7.3]**
4. Chlorite	2	9.2.1.2**[, 9.2.2.2.1.11]**	3	**[~~9.2.3~~ 12.6.1 to 12.6.5, 12.7.1 to 12.7.3]**
5. Chlorine(MRDL)	2	**[~~12.3.1~~ 1.19.3.1]**	3	**[~~12.4~~ 12.6.1 to 12.6.5, 12.8.1]**
6. Chloramine (MRDL)	2	**[~~12.3.1~~ 1.19.3.1]**	3	**[~~12.4~~ 12.6.1 to 12.6.5, 12.8.1]**
7. Chlorine dioxide (MRDL), where any two consecutive daily samples at entrance to the distribution system only are above MRDL	2	**[~~12.3.1~~ 1.19.3.1, 12.14.2]**	2[15],3	**[~~12.4~~ 12.6.1 to 12.6.5, 12.8.2, 12.14.2]**
8. Chlorine dioxide (MRDL), where sample(s) in distribution system the next day are also above MRDL	[16]1	**[~~12.3.1~~ 1.19.3.1, 12.14.2]**	1	**[~~12.4~~ 12.6.1 to 12.6.5, 12.8.2, 12.14.2]**
9. Control of DBP precursors – TOC (TT)	2	**[~~13.7.1.3~~ 12.16]**	3	**[~~13.9~~ 12.6.1 to 12.6.5, 12.9]**
10. Bench marking and disinfection profiling	N/A	N/A	3	**[~~18.5~~ 17.5]**
11. Development of monitoring plan	N/A	N/A	3	**[~~18.5~~ 12.11]**
H. Other Treatment Techniques				
1. Acrylamide	2	9.3.3	N/A	N/A
2. Epichlorohydrin	2	9.3.3	N/A	N/A
II. Unregulated Contaminant Monitoring[17]				
A. Unregulated contaminants	N/A	N/A	3	**[40]** CFR 141.40

III. Other Situations Requiring Public Notice				
A. Exceedance of nitrate MCL for non-community systems, as allowed by the Division	1	9.1.12	N/A	N/A
B. Availability of unregulated contaminant monitoring data	3	**[40]** CFR 141.40	N/A	N/A
C. Waterborne disease outbreak	1	2.0	N/A	N/A
D. Other waterborne emergency[20]	1	N/A	N/A	N/A
E. Other situations as determined by the Division	[21]1,2,3	N/A	N/A	N/A
F. Source water sample positive for Ground Water Rule Fecal indicators: *E. coli*, enterococci, or coliphage.	1	8.3	N/A	N/A

[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 Division. The Division may, at their option, also require a more stringent public notice tier (e.g., Tier 1 instead of Tier 2 or Tier 2 instead of tier 3) for specific violations and situations listed in this Table, as authorized under subsection 4.2.1.1.5.

[2] MCL – Maximum Contaminant Level, MRDL – Maximum Residual Disinfectant Level, TT – Treatment Technique

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

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

[5] Systems that violate the turbidity MCL of 5 NTU based on an average of measurements over two consecutive days must consult with the Division within 24 hours after learning of the violation. Based on this consultation, the Division may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the Division in the 24-hour period, the violation is automatically elevated to Tier 1.

[6] Systems with treatment technique violations involving a single exceedance of a maximum turbidity limit under the Surface Water Treatment Rule (SWTR), the Interim Enhanced Surface Water Treatment Rule (IESWTR) or the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR are required to consult with the Division within 24 hours after learning of the violation. Based on this consultation, the Division may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the Division in the 24-hour period, the violation is automatically elevated to Tier 1.

[7] Most of the requirements of the IESWTR Section 18.0 become effective January 1, 2002 for Subpart H systems (surface water systems and groundwater under the direct influence of surface water) serving at least 10,000 persons. However, subsection 10.8 has some requirements that become effective as early as April 16, 1999. The SWTR remains in effect for systems serving at least 10,000 persons even after 2002; the IESWTR adds additional requirements and does not in many cases supersede the SWTR.

[8] The arsenic MCL citations are effective January 23, 2006. Until then, the citations are §141.11(b) and §141.23(n).

[9] The uranium MCL Tier 2 violation citations are effective December 8, 2003 for all community water systems.

[10] The uranium Tier 3 violation citations are effective December 8, 2000 for all community water systems.

[11] The arsenic Tier 3 violation MCL citations are effective December 8, 2003 for all community water systems.

[12] Failure to take a confirmation sample within 24 hours for nitrate or nitrite after an initial sample exceeds the MCL is a Tier 1 violation. Other monitoring violations for nitrate are Tier 3.

[13] Surface water or ground water under the direct influence of surface water community and non-transient non-community systems serving ≥10,000 must comply with new DBP MCLs, disinfectant MRDLs, and related monitoring requirements beginning January 1, 2002. All other community and non-transient non-community systems must meet the MCLs and MRDLs beginning January 1, 2004. Surface water or ground water under the direct influence of surface water transient non-community systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. Surface water or ground water under the direct influence of surface water transient non-community systems serving fewer than 10,000 persons and using only groundwater not under the direct influence of surface water

and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.

[14] **[40]** CFR 141.64(b)(1) 141.132(a)-(b) apply until §§141.620-141.630 take effect under the schedule in §141.620(c).

[15] Failure to monitor for chlorine dioxide at the entrance to the distribution system the day after exceeding the MRDL at the entrance to the distribution system is a Tier 2 violation.

[16] If any daily sample taken at the entrance to the distribution system exceeds the MRDL for chlorine dioxide and one or more samples taken in the distribution system the next day exceed the MRDL, Tier 1 notification is required. Failure to take the required samples in the distribution system after the MRDL is exceeded at the entry point also triggers Tier 1 notification.

[17] Some water systems must monitor for certain unregulated contaminants listed in **[40]** CFR 141.40

[20] Other waterborne emergencies require a Tier 1 public notice under subsection 4.2.1.1.1.1.8 for situations that do not meet the definition of a waterborne disease outbreak given in 40 CFR 141.2 but that still have the potential to have serious adverse effects on health as a result of short-term exposure. These could include outbreaks not related to treatment deficiencies, as well as situations that have the potential to cause outbreaks, such as failures or significant interruption in water treatment processes, natural disasters that disrupt the water supply or distribution system, chemical spills, or unexpected loading of possible pathogens into the source water.

[21] The Division may place other situations in any tier it believes appropriate, based on threat to public health.

[22] Failure to collect three or more samples for *Cryptosporidium* analysis is a Tier 2 violation requiring special notice as specified in subsection 4.2.1.1.1.1.6. All other monitoring and testing violations are Tier 3.

4.2.3.2 Notification to New Billing Units:

4.2.3.2.1 The owner of a community public water system must give a copy of the most recent public notice for any outstanding violation of any MCL, MRDL, or any treatment technique requirement, or monitoring violation to all new billing units or new hookups prior to or at the time service begins.

4.2.3.2.2 Non-community water systems must continuously post the public notice in conspicuous locations in order to inform new consumers of any continuing violation, variance or exemption, or other situation requiring a public notice for as long as the violation, variance, exemption, or other situation persists.

4.2.3.3 All posted public notices shall remain readable and be protected by glass, plastic or some other suitable covering and remain in place until such time that the violation or failure has terminated or seven (7) days, whichever is longer.

4.2.3.4 Notice to the public required by this section may be given by the Division should the water supplier fail to do so.

4.2.3.5 Nothing in this section shall limit the authority of the Secretary, Delaware Health and Social Services to require notification by newspaper and to radio and television stations when circumstances make more immediate or broader notice appropriate to protect the public's health.

4.2.4 Public Notification Requirements Pertaining to Lead

4.2.4.1 Applicability of Public Notification Requirements

4.2.4.1.1 Reserved

4.2.4.1.2 Definition of lead free. For the purposes of this paragraph, the term "lead free" when used with respect to solders and flux refers to solder and flux containing not more than 0.2 percent lead; when used with respect to pipes and pipe fittings, refers to pipes and pipe fittings containing not more than 8.0 percent lead; and when used with respect to plumbing fittings and fixtures intended by the manufacturer to dispense water for human ingestion refers to fittings and fixtures that are in compliance with standards established in accordance with 42 U.S.C. 300g-6(e).

4.2.4.1.3 The owner shall review, correct and complete the public notice and return it to the Division within seventy-two (72) hours with approval noted.

4.2.4.2 Manner of Notification

4.2.4.2.1 Notice shall be given to persons served by the PWS either by:

4.2.4.2.1.1 Three newspaper notices one ((1) for each of three (3) consecutive months and the first no later than June 19, 1988) or;

4.2.4.2.1.2 Once by mail notice with the water bill or in a separate mailing by June 19, 1988 or;

4.2.4.2.1.3 Once by hand delivery by June 19, 1988.

4.2.4.2.2 For NTNCWS, notice may be given by continuous posting. If posting is used, the notice shall be posted in a conspicuous place in the area served by the system and start no later than June 19, 1988, and continue for three (3) months.

4.2.4.3 General Content of Notice

4.2.4.3.1 Notices issued under this section shall provide a clear and readily understandable explanation of the potential sources of lead in drinking water, potential adverse health effects, reasonable available methods of mitigating known or potential lead content in drinking water, any steps the water system is taking to mitigate lead content in drinking water and the necessity for seeking alternative water supplies, if any. Use of the mandatory language in subsection 4.2.4.4 in the notice will be sufficient to explain potential adverse health effects.

4.2.4.3.2 Each notice shall also include specific advice on how to determine if materials containing lead have been used in homes or the water distribution system and how to minimize exposure to water likely to contain high levels of lead. Each notice shall be conspicuous and shall not contain unduly technical language, unduly small print, or similar problems that frustrate the purpose of the notice. Each notice shall contain the telephone number of the owner, operator or designee of the PWS as a source of additional information regarding the notice. Where appropriate, the notice shall be multi-lingual.

4.2.4.4 Mandatory Heath Effects Information: When providing the information in public notices required under subsection 4.2.4.3 on the potential adverse health effects of lead in drinking water, the owner of the water system shall include the following mandatory language specific to lead.

4.2.4.4.1 Lead: The United States Environmental Protection Agency (USEPA) sets drinking water standards and has determined that lead is a health concern at certain levels of exposure. There is currently a standard of 0.020 parts per million (ppm). Part of the purpose of this notice is to inform you of the potential adverse health effects of lead. This is being done even though your water may not be in violation of the current standard. The USEPA and others are concerned about lead in drinking water. Too much lead in the human body can cause serious damage to the brain, kidneys, nervous system and red blood cells. The greatest risk, even with short-term exposure, is to young children and pregnant women. Lead levels in your drinking water are likely to be highest:

- if your home or water system has lead pipes, or
- if your home has copper pipes with lead solder, and
- if the home is less than five (5) years old
- if you have soft or acidic water, or
- if water sits in the pipes for several hours.

4.2.5 Public Notification Requirements Pertaining to VOCs and MRDLs: If a CWS or NTNCWS fails to comply with an applicable MCL or MRDL level established under subsections 9.1.1 and 12.3, the water supplier shall notify persons served by the system as provided in subsection 4.2.3.

4.2.6 Public Notification Requirements Pertaining to Unregulated Contaminants:

4.2.6.1 The owner of a community water system or non-transient, non-community water system required to monitor under **[40]** CFR 141.40 must notify persons served by the system of the availability of the results of such sampling no later than 90 days after the monitoring results are known.

4.2.6.2 The form and manner of the public notice must follow the requirements for a Tier 3 public notice prescribed in subsection 4.2.1.3.3. The notice must also identify a person and provide the telephone number to contact for information on the monitoring results.

4.2.7 Procedures for Issuance of a Public Notice

4.2.7.1 PMCL Violation:

4.2.7.1.1 Upon notification that a condition exists as indicated in subsection 4.2.1.1, the Division shall prepare a notice in accordance with subsection 4.2.2 and a draft public notice for use in public notification by the water supply owner.

4.2.7.1.2 As soon as possible, but in no case more than twenty-four (24) hours, the Division shall forward the notice and draft notice to the water supply owner.

4.2.7.1.3 The owner shall review, correct and complete the public notice and return it to the Division within twenty-four (24) hours with approval noted.

4.2.7.1.4 The Division shall resolve any discrepancies and approve the public notice as rapidly as possible and retain the public notice until the final confirmation sample results are received.

4.2.7.1.5 Upon receipt of the confirmation sampling results, the Division shall determine if a public notice is warranted and shall return the approved public notice to the owner for appropriate public notification.

4.2.7.1.6 For all Tier 1 violations as noted in subsection 4.2.1.1 the owner shall notify the Division as soon as possible. However, the owner shall be responsible for issuing the public notice to consumers within twenty-four (24) hours.

4.2.7.2 Other Violations or Circumstances Requiring Public Notification:

4.2.7.2.1 Upon notification that a condition exists as indicated in subsections 4.2.1.2. and 4.2.1.3, the Division shall initiate the preparation of a draft public notice and notice if appropriate.

4.2.7.2.2 As soon as possible, but in no case more than seventy-two (72) hours, the Division shall forward a copy of the draft public notice with attached notice, if applicable, to the water supply owner.

4.2.7.2.3 The owner shall review, correct and complete the public notice and return it to the Division within seventy-two (72) hours with approval noted.

4.2.7.2.4 The Division shall resolve any discrepancies and approve the public notice as rapidly as possible.

4.2.7.2.5 The Division shall then return the approved public notice to the owner for appropriate public notification.

5.0 Record Maintenance:

5.1 Retaining Records:

5.1.1 Effective upon the adoption of these Regulations, any owner **[or operator]** of a PWS shall accumulate and make available to the Division within the time stated the following records which shall be retained on the premises or at a convenient location:

5.1.1.1 Records of microbiological analyses and turbidity analyses made pursuant to these regulations shall be kept for not less than five (5) years.

5.1.1.2 Chemical analyses records for not less than ten (10) years.

5.1.1.3 Actual laboratory reports may be kept, or data may be transferred to tabular summaries, or scanned copies of results, provided that the following information is included:

5.1.1.3.1 The date, place and time of sampling and the name of the person who collected the sample;

5.1.1.3.2 Identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample;

5.1.1.3.3 Date of analysis;

5.1.1.3.4 Laboratory and person responsible for performing analysis;

5.1.1.3.5 The analytical technique/method used and;

5.1.1.3.6 The results of the analysis.

5.1.1.4 Records of action taken by the system to correct violations of PMCL regulations shall be kept for a period not less than three (3) years after the last action taken with respect to the particular violation involved.

5.1.1.5 Reports, summaries and communications relating to sanitary surveys shall be kept for a period not less than ten (10) years after completion of the sanitary survey of the system conducted by the system itself, by a private consultant or by any local, State or Federal agency.

5.1.1.6 Copies of monitoring plans developed pursuant to these regulations shall be kept for the same period of time as the records of analyses taken under the plan are required to be kept under subsection 5.1.1.1 except as specified elsewhere in these regulations.

5.1.1.7 Copies of Public Notices, Consumer Confidence Reports, the certifications for each, and any decisions by the Division relating to the Public Notice shall be kept for five (5) years.

5.1.1.8 Any decisions made pursuant to the provisions of Sections 14.0 and 15.0.

5.1.1.8.1 IDSE monitoring plans, plus any modifications required by the Division, must be kept until replaced by approved IDSE reports.

5.1.1.8.2 IDSE reports and 40/30 certifications, plus any modifications required by the Division, must be kept until replace or revised in their entirety.

5.1.1.8.3 Operational evaluations submitted by a system must be kept for 10 years following submission.

5.2 Records Kept by Division:

5.2.1 Records of microbiological analyses of repeat or special samples shall be retained for not less than one (1) year in the form of actual laboratory reports or in an appropriate summary form. Records of each of the following decisions made pursuant to the total coliform provisions shall be made in writing and retained by the Division.

5.2.1.1 Records of the following decisions must be retained for five (5) years:

5.2.1.1.1 Any decision to waive the twenty-four (24) hour time limit for collecting repeat samples after a total coliform positive routine sample if the public water system has a logistical problem in collecting the repeat sample that is beyond the system's control, and what alternative time limit the system must meet.

5.2.1.1.2 Any decision to allow a system to waive the requirement for five (5) routine samples the month following a total coliform-positive sample. If the waiver decision is made, the record of the decision must contain all items listed in that paragraph.

5.2.1.1.3 Any decision to invalidate a total coliform-positive sample. If the decision to invalidate a total coliform positive sample is made, the record of the decision must contain all the items in that paragraph.

5.2.1.2 Records of each of the following decisions must be retained in such a manner so that each system's current status may be determined:

5.2.1.2.1 Any decision to reduce the total coliform monitoring frequency for a CWS serving one thousand (1000) persons or fewer, that has no history of total coliform contamination in its current configuration and had a sanitary survey conducted within the last five (5) years showing that the system is supplied solely by a protected ground water source and is free of sanitary defects, to less than once per month and what the reduced monitoring frequency is. A copy of the reduced monitoring frequency must be provided to the system.

5.2.1.2.2 Any decision to reduce the total coliform monitoring frequency for a NCWS using only ground water and serving one thousand (1000) persons or fewer to less than once per quarter, and what the reduced monitoring frequency is. A copy of the reduced monitoring frequency must be provided to the system.

5.2.1.2.3 Any decision to reduce the total coliform monitoring frequency for a NCWS using only ground water and serving more than one thousand (1000) persons during any month the system serves one thousand (1000) persons or fewer. A copy of the reduced monitoring frequency must be provided to the system.

5.2.1.2.4 Any decision to waive the twenty-four hour limit for taking a total coliform sample for a PWS which uses surface water, or ground water under the influence of surface water, and which does not practice filtration, and which measures a source water turbidity level exceeding one (1) NTU near the first service connection.

5.2.1.2.5 Any decision that a NCWS is using only protected and disinfected ground water and therefore may reduce the frequency of its sanitary survey to less than once every five (5) years and what that frequency is. A copy of the reduced frequency must be provided to the system.

5.2.1.2.6 A list of agents other than the Division, if any, approved by the Division to conduct sanitary surveys.

5.2.1.2.7 Any decision to allow a PWS to forgo fecal coliform or E. coli testing on a total coliform positive sample if that system assumes that the total coliform positive sample is fecal coliform positive or E. coli positive.

6.0 Consumer Confidence Reports:

6.1 Purpose and applicability:

6.1.1 This section establishes the minimum requirements for the content of annual reports that community water systems must deliver to their customers. These reports must contain information on the quality of the water delivered by the systems and characterize the risks (if any) from exposure to contaminants detected in the drinking water in an accurate and understandable manner.

6.1.1.1 This section applies only to community water systems.

6.1.1.2 For purposes of this section, customers are defined as billing units or service connections to which water is delivered by a community water system.

6.1.1.3 For purposes of this section, detected means: at or above the levels prescribed by **[40]** CFR 141.23(a)(4) for inorganic contaminants, at or above the levels prescribed by **[40]** CFR 141.24(f)(7) for the contaminants listed in subsection 9.2.1.3, at or above the level prescribed by

[40] CFR 141.24(h)(18) for the contaminants listed in subsection 9.2.1.1, and at or above the levels prescribed by **[40]** CFR 141.25(c) for radioactive contaminants.

6.2 Effective dates:

6.2.1 The regulations in this section shall take effect on September 18, 1998.

6.2.1.1 Each existing community water system must deliver its first report by October 19, 1999, its second report by July 1, 2000, and subsequent reports by July 1 annually thereafter. The first report must contain data collected during, or prior to, calendar year 1998 as prescribed in subsection 6.3.4. Each report thereafter must contain data collected during, or prior to, the previous calendar year.

6.2.1.2 A new community water system must deliver its first report by July 1 of the year after its first full calendar year in operation and annually thereafter.

6.2.1.3 A community water system that sells water to another community water system must deliver the applicable information required in subsection 6.3.3 to the buyer system:

6.2.1.3.1 No later than April 19, 1999, by April 1, 2000, and by April 1 annually thereafter; or,

6.2.1.3.2 On a date mutually agreed upon by the seller and the purchaser and specifically included in a contract between the parties.

6.3 Content of the reports: Each community water system must provide to its customers an annual report that contains the information specified in this section and subsection 6.3.4.

6.3.1 Each community water system must provide to its customers an annual report that contains the information specified in this section and subsection 6.3.4.

6.3.2 Information on the source of the water delivered:

6.3.2.1 Each report must identify the source(s) of the water delivered by the community water system by providing information on:

6.3.2.1.1 The type of the water: e.g., surface water, ground water; and

6.3.2.1.2 The commonly used name (if any) and location of the body (or bodies) of water.

6.3.2.2 If a source water assessment has been completed, the report must notify consumers of the availability of this information and the means to obtain it. In addition, systems are encouraged to highlight in the report significant sources of contamination in the source water area if they have readily available information. Where a system has received a source water assessment from the Division, the report must include a brief summary of the system's susceptibility to potential sources of contamination, using language provided by the Division or written by the operator.

6.3.3 Definitions.

6.3.3.1 Each report must include the following definitions:

6.3.3.1.1 Maximum Contaminant Level Goal or MCLG: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

6.3.3.1.2 Maximum Contaminant Level or MCL: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

6.3.3.2 A report for a community water system operating under a variance or exemption issued under sections 1415 or 1416 of the Safe Drinking Water Act must include the following definition: Variances and Exemptions: Division or EPA permission not to meet an MCL or a treatment technique under certain conditions.

6.3.3.3 A report which contains data on a contaminant for which the Division has set a treatment technique or an action level must include one or both of the following definitions as applicable:

6.3.3.3.1 Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

6.3.3.3.2 Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

6.3.3.3.3 Maximum Residual Disinfectant Level Goal or MRDLG: The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

6.3.3.3.4 Maximum Residual Disinfectant Level or MDRDL: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control microbial contaminants.

6.3.3.4 A report that contains information regarding a Level 1 or Level 2 Assessment required under subsection 7.4 must include the applicable definitions:

6.3.3.4.1 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 water system.

6.3.3.4.2 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 our water system on multiple occasions.

6.3.4 Information on Detected Contaminants.

6.3.4.1 This subsection specifies the requirements for information to be included in each report for contaminants subject to mandatory monitoring (except Cryptosporidium). It applies to:

6.3.4.1.1 Contaminants subject to an MCL, MRDL, action level, or treatment technique (regulated contaminants);

6.3.4.1.2 Contaminants for which monitoring is required by **[40]** CFR 141.40 (unregulated contaminants);

6.3.4.1.3 Unregulated contaminants for which the US EPA has developed and published a health advisory; and

[~~6.3.4.1.4 Disinfection byproducts or microbial contaminants for which monitoring is required by sections CFR 141.142 and 141.143 except as provided under subsection 6.3.5.1 and which are detected in the finished water.~~]

6.3.4.2 The data relating to these contaminants must be displayed in one table or in several adjacent tables. Any additional monitoring results which a community water system chooses to include in its report must be displayed separately.

6.3.4.3 The data must be derived from data collected to comply with EPA and State monitoring and analytical requirements during calendar year 1998 for the first report and subsequent calendar years thereafter except that:

6.3.4.3.1 Where a system is allowed to monitor for regulated contaminants less often than once a year, the table(s) must include the date and results of the most recent sampling and the report must include a brief statement indicating that the data presented in the report are from the most recent testing done in accordance with the regulations. No data older than 5 years need be included.

[~~6.3.4.3.2 Results of monitoring in compliance with subsections 141.142 and 141.143 (Unregulated Contaminant Monitoring Rule) need only be included for 5 years from the date of last sample or until any of the detected contaminants becomes regulated and subject to routine monitoring requirements, whichever comes first.~~]

6.3.4.4 For detected regulated contaminants (listed in subsection 6.6), the table(s) must contain:

6.3.4.4.1 The MCL for that contaminant expressed as a number equal to or greater than 1.0 (as provided in subsection 6.6);

6.3.4.4.2 The MCLG for that contaminant expressed in the same units as the MCL;

6.3.4.4.3 If there is no MCL for a detected contaminant, the table must indicate that there is a treatment technique, or specify the action level, applicable to that contaminant, and the report must include the definitions for treatment technique and/or action level, as appropriate, specified in subsection 6.3.3;

6.3.4.4.4 For contaminants subject to an MCL, except turbidity and total coliforms, the highest contaminant level used to determine compliance with an NPDWR and the range of detected levels, as follows:

6.3.4.4.4.1 When compliance with the MCL is determined annually or less frequently: The highest detected level at any sampling point and the range of detected levels expressed in the same units as the MCL.

6.3.4.4.4.2 When compliance with the MCL is determined by calculating a running annual average of all samples taken at a monitoring location: the highest average of any of the monitoring locations and the range of all monitoring locations expressed in the same units as the MCL. For the MCLs for TTHM and HAA5 in subsection 9.2.1.2, systems must include the highest locational running annual average for TTHM and HAA5 and the range of individual sample results for all monitoring locations expressed in the same units as the MCL. If more than one location exceeds TTHM or HAA5 MCL, the system must include the locational running annual average for all locations that exceed the MCL.

6.3.4.4.4.3 When compliance with the MCL is determined on a system-wide basis by calculating a running annual average of all samples at all monitoring locations: the average and range of detection expressed in the same units as the MCL. The system is required to include individual sample results for the IDSE conducted under Section 13.0 when determining the range of the TTHM and HAA5 results to be reported in the annual consumer confidence report for the calendar year that the IDSE samples were taken.

Note to subsection 6.3.4.4.4: When rounding of results to determine compliance with the MCL is allowed by the regulations, rounding should be done prior to multiplying the results by the factor listed in subsection 6.6;

6.3.4.4.5 For turbidity.

6.3.4.4.5.1 When it is reported pursuant to subsection 16.4: The highest average monthly value.

6.3.4.4.5.2 When it is reported pursuant to the requirements of 40 CFR 141.71: the highest monthly value. The report should include an explanation of the reasons for measuring turbidity.

6.3.4.4.5.3 When it is reported pursuant to subsections 16.4, 17.0 or 16.4.4: The highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in subsections 16.4, 17.0 or 16.4.4 for the filtration technology being used. The report should include an explanation of the reasons for measuring turbidity;

6.3.4.4.6 For lead and copper: the 90th percentile value of the most recent round of sampling and the number of sampling sites exceeding the action level;

6.3.4.4.7 For total coliform analytical results until December 31, 2015:

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

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

6.3.4.4.8 For fecal coliform and *E. coli* until December 31, 2015: The total number of positive samples; and

6.3.4.4.9 The likely source(s) of detected contaminants to the best of the operator's knowledge. Specific information regarding contaminants may be available in sanitary surveys and source water assessments, and should be used when available to the operator. If the operator lacks specific information on the likely source, the report must include one or more of the typical sources for that contaminant listed in subsection 6.6 that is most applicable to the system.

6.3.4.4.10 For E. coli analytical results under subsection 7.4: The total number of positive samples.

6.3.4.5 If a community water system distributes water to its customers from multiple hydraulically independent distribution systems that are fed by different raw water sources, the table should contain a separate column for each service area and the report should identify each separate distribution system. Alternatively, systems could produce separate reports tailored to include data for each service area.

6.3.4.6 The table(s) must clearly identify any data indicating violations of MCLs, MRDLs or treatment techniques and the report must contain a clear and readily understandable explanation of the violation including: the length of the violation, the potential adverse health effects, and actions taken by the system to address the violation. To describe the potential health effects, the system must use the relevant language of subsection 6.6.

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

6.3.5 Information on Cryptosporidium, radon, and other contaminants:

6.3.5.1 If the system has performed any monitoring for Cryptosporidium, including monitoring performed to satisfy the requirements of **[40]** CFR 141.143, which indicates that Cryptosporidium may be present in the source water or the finished water, the report must include:

6.3.5.1.1 A summary of the results of the monitoring; and

6.3.5.1.2 An explanation of the significance of the results.

6.3.5.2 If the system has performed any monitoring for radon which indicates that radon may be present in the finished water, the report must include:

6.3.5.2.1 The results of the monitoring; and

6.3.5.2.2 An explanation of the significance of the results.

6.3.5.3 If the system has performed additional monitoring which indicates the presence of other contaminants in the finished water, EPA strongly encourages systems to report any results which may indicate a health concern. To determine if results may indicate a health concern, EPA recommends that systems find out if EPA has proposed an NPDWR or issued a health advisory for that contaminant by calling the Safe Drinking Water Hotline (800-426-4791). EPA considers detects above a proposed MCL or health advisory level to indicate possible health concerns. For such contaminants, EPA recommends that the report include:

6.3.5.3.1 The results of the monitoring; and

6.3.5.3.2 An explanation of the significance of the results noting the existence of a health advisory or a proposed regulation.

6.3.6 Compliance with NPDWR. In addition to the requirements of subsection 6.3.4.6, the report must note any violation that occurred during the year covered by the report of a requirement listed below, and include a clear and readily understandable explanation of the violation, any potential adverse health effects, and the steps the system has taken to correct the violation.

6.3.6.1 Monitoring and reporting of compliance data;

6.3.6.2 Filtration and disinfection prescribed by Section 16.0. For systems which have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of such equipment or processes which constitutes a violation, the report must include the following language as part of the explanation of potential adverse health effects: Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

6.3.6.3 Lead and copper control requirements prescribed by Section 10. For systems which fail to take one or more actions prescribed by subsections 10.1.2, 10.2, 10.3, 10.4, and 10.5, the report must include the applicable language of 6.6 for lead, copper, or both.

6.3.6.4 Treatment techniques for Acrylamide and Epichlorohydrin prescribed by subsection 9.3.3. For systems which violate the requirements of subsection 9.3.3, the report must include the relevant language from 6.6.

6.3.6.5 Recordkeeping of compliance data.

6.3.6.6 Special monitoring requirements prescribed by **[40]** CFR sections 141.40 and 141.41; and

6.3.6.7 Violation of the terms of a bilateral compliance agreement, or an administrative or judicial order.

6.3.6.7.1 A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the bilateral compliance agreement, administrative or judicial order.

6.3.7 Additional information:

6.3.7.1 The report must contain a brief explanation regarding contaminants which may reasonably be expected to be found in drinking water including bottled water. This explanation may include the language of subsections 6.3.8.1 through 6.3.8.1.3 or systems may use their own comparable language. The report also must include the language of subsection 6.3.8.1.4.

6.3.7.1.1 The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

6.3.7.1.2 Contaminants that may be present in source water include:

6.3.7.1.2.1 Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

6.3.7.1.2.2 Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

6.3.7.1.2.3 Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

6.3.7.1.2.4 Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

6.3.7.1.2.5 Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

6.3.7.1.3 In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

6.3.7.1.4 Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

6.3.7.2 The report must include the telephone number of the owner, operator, or designee of the community water system as a source of additional information concerning the report.

6.3.7.3 In communities with a large proportion of non-English speaking residents, as determined by the Division, the report must contain information in the appropriate language(s) regarding the importance of the report or contain a telephone number or address where such residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language.

6.3.7.4 The report must include information (e.g., time and place of regularly scheduled board meetings) about opportunities for public participation in decisions that may affect the quality of the water.

6.3.7.5 The systems may include such additional information as they deem necessary for public education consistent with, and not detracting from, the purpose of the report.

6.3.7.6 Systems required to comply with Section 8.0 Ground Water Rule.

6.3.7.6.1 Any ground water system that receives notice from the Division of a significant deficiency or notice from a laboratory of a fecal indicator-positive ground water source sample that is not invalidated by the Division under subsection 8.3.4 must inform its customers of any significant deficiency that is uncorrected at the time of the next report or of any fecal indicator-positive ground water source sample in the next report. The system must continue to inform the public annually until the Division determines that particular significant deficiency is corrected or the fecal contamination in the ground water source is addressed under subsection 8.4.1. Each report must include the following elements.

6.3.7.6.1.1 The nature of the particular significant deficiency or the source of the fecal contamination (if the source is known) and the date the significant deficiency was identified by the Division or the dates of the fecal indicator-positive ground water source samples;

6.3.7.6.1.2 If the fecal contamination in the ground water source has been addressed under subsection 8.4.1 and the date of such action;

6.3.7.6.1.3 For each significant deficiency or fecal contamination in the ground water source that has not been addressed under subsection 8.4.1, the Division-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed; and

6.3.7.6.1.4 If the system receives notice of a fecal indicator-positive ground water source sample that is not invalidated by the division under subsection 8.3.4, the potential health effects using the health effects language of subsection 6.6.

6.3.7.6.2 If directed by the Division, a system with significant deficiencies that have been corrected before the next report is issued must inform its customers of the significant deficiency, how the deficiency was corrected, and the date of the correction under subsection 6.3.7.6.1.

6.3.7.7 Systems required to comply with subsection 7.4 Revised Total Coliform Rule

6.3.7.7.1 Any system required to comply with the Level 1 assessment requirement or the Level 2 assessment requirement that is not due to an E. coli MCL violation must include in the report the text found subsection 6.3.7.7.1.1 and subsections 6.3.7.7.1.2 and 6.3.7.7.1.3 as appropriate, filling in the blanks accordingly and the text found in subsections 6.3.7.7.1.4.1 and 6.3.7.7.1.4.2 if appropriate.

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

6.3.7.7.1.2 During the past year we were required to conduct [INSERT NUMBER OF LEVEL 1 ASSESSMENTS] Level 1 assessment(s). [INSERT NUMBER OF LEVEL 1 ASSESSMENTS] Level 1 assessment(s) were completed. In addition, we were required to take [INSERT NUMBER OF CORRECTIVE ACTIONS] corrective actions and we completed [INSERT NUMBER OF CORRECTIVE ACTIONS] of these actions.

6.3.7.7.1.3 During the past year [INSERT NUMBER OF LEVEL 2 ASSESSMENTS] Level 2 assessments were required to be completed for our water system. [INSERT NUMBER OF LEVEL 2 ASSESSMENTS] Level 2 assessment(s) were completed. In addition, we were required to take [INSERT NUMBER OF CORRECTIVE ACTIONS] corrective actions and we completed [INSERT NUMBER OF CORRECTIVE ACTIONS] of these actions.

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

6.3.7.7.1.4.1 During the past year we failed to conduct all of the required assessment(s).

6.3.7.7.1.4.2 During the past year we failed to correct all identified defects that were found during the assessment.

6.3.7.7.2 Any system required to conduct a Level 2 assessment due to an E. coli MCL violation must include in the report the text found in subsections 6.3.7.7.2.1 and 6.3.7.7.2.2, filling in the blanks accordingly and the text found in subsections 6.3.7.7.2.3.1 and 6.3.7.7.2.3.2, if appropriate.

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

6.3.7.7.2.2 We were required to complete a Level 2 assessment because we found E. coli in our water system. In addition, we were required to take [INSERT NUMBER OF CORRECTIVE ACTIONS] corrective actions and we completed [INSERT NUMBER OF CORRECTIVE ACTIONS] of these actions.

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

6.3.7.7.2.3.1 We failed to conduct the required assessment.

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

6.3.7.7.3 If a system detects E. coli and has violated the E. coli MCL, in addition to completing the table as required in subsection 6.3.4.4, the system must include one or more of the following statements to describe any noncompliance, as applicable:

6.3.7.7.3.1 We had an E. coli-positive repeat sample following a total coliform-positive routine sample.

6.3.7.7.3.2 We had a total coliform-positive repeat sample following an E. coli-positive routine sample.

6.3.7.7.3.3 We failed to take all required repeat samples following an E. coli-positive routine sample.

6.3.7.7.3.4 We failed to test for E. coli when any repeat sample tests positive for total coliform.

6.3.7.7.4 If a system detects E. coli and has not violated the E. coli MCL, in addition to completing the table as required in subsection 6.3.4.4, the system may include a statement that explains that although they have detected E. coli they are not in violation of the E. coli MCL.

6.4 Required additional health information:

6.4.1 All reports must prominently display the following language:

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

6.4.2 Ending in the reports due by July 1, 2001 a system which detects arsenic at levels above 0.025 mg/L, but below 0.05 mg/L and beginning in the report due by July 1, 2002 a system that detects arsenic above 0.005 mg/L and up to and including 0.010 mg/L:

6.4.2.1 Must include in its report a short informational statement about arsenic, using language such as: While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

6.4.2.2 May write its own educational statement, but only in consultation with the Division.

6.4.3 A system which detects nitrate at levels above 5 mg/l, but below the MCL:

6.4.3.1 Must include a short informational statement about the impacts of nitrate on children using language such as: Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

6.4.3.2 May write its own educational statement, but only in consultation with the Division.

6.4.4 Every report must include the following lead-specific information:

6.4.4.1 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 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

6.4.4.2 A system may write its own educational statement, but only in consultation with the Division.

6.4.5 Community water systems that detect TTHM above 0.080 mg/L, but below the MCL in subsection 9.2.1.2 as an annual average, monitored and calculated under the provisions of **[40]** CFR section 141.30, must include health effects language for TTHMs prescribed in subsection 6.6.

6.5 Report delivery and recordkeeping:

6.5.1 Except as provided in subsection 6.5.7, each community water system must mail or otherwise directly deliver one copy of the report to each customer.

6.5.2 The system must make a good faith effort to reach consumers who do not get water bills, using means recommended by the Division. EPA expects that an adequate good faith effort will be tailored to the consumers who are served by the system but are not bill-paying customers, such as renters or workers. A good faith effort to reach consumers would include a mix of methods appropriate to the particular system such as: Posting the reports on the Internet; mailing to postal patrons in metropolitan areas; advertising the availability of the report in the news media; publication in a local newspaper; posting in public places such as cafeterias or lunch rooms of public buildings; delivery of multiple copies for distribution by single-biller customers such as apartment buildings or large private employers; delivery to community organizations.

6.5.3 No later than the date the system is required to distribute the report to its customers, each community water system must mail a copy of the report to the Division, followed within ten (10) days by a certification that the report has been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to the Division.

6.5.4 No later than the date the system is required to distribute the report to its customers, each community water system must deliver the report to any other agency or clearinghouse identified by the Division.

6.5.5 Each community water system must make its reports available to the public upon request.

6.5.6 Each community water system serving 100,000 or more persons must post its current year's report to a publicly-accessible site on the Internet.

6.5.7 Community water systems serving fewer than 10,000 persons may forego the requirements under subsection 6.5.2 if they comply with the following:

6.5.7.1 Such systems must:

6.5.7.1.1 Publish the reports in one or more local newspapers serving the area in which the system is located;

6.5.7.1.2 Inform the customers that the reports will not be mailed, either in the newspapers in which the reports are published or by other means approved by the Division; and

6.5.7.1.3 Make the reports available to the public upon request.

6.5.7.2 Systems serving 500 or fewer persons may forego the requirements of subsections 6.5.7.1 and 6.5.7.2 if they provide notice at least once per year to their customers by mail, door-to-door delivery or by posting in an appropriate location that the report is available upon request.

6.5.8 Any system subject to this section must retain copies of its consumer confidence report for no less than 5 years.

6.6 Consumer Confidence Report Requirements for Regulated Contaminants

Appendix a to Section 6.0 - regulated contaminants

Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Microbiological contaminants:						
Total Coliform Bacteria†	MCL: (systems that collect ≥40 samples/ month) 5% of monthly samples are positive; (systems that collect <40 samples/ month) 1 positive monthly sample.		MCL: (systems that collect ≥40 samples/month) 5% of monthly samples are positive; (systems that collect <40 samples/month) 1 positive monthly sample.	0	Naturally present in the environment	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.
Total Coliform Bacteria	TT		TT	N/A	Naturally present in the environment	Use language found in § 141.153(h)(7)(i)(A)
Fecal coliform and E. coli†	0		0	0	Human and animal fecal waste	Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely-compromised immune systems.

E. coli ‡	Routine and repeat samples are total coliform-positive and either is *E. coli*-positive or system fails to take repeat samples following *E. coli*-positive routine sample or system fails to analyze total coliform—positive repeat sample for *E. coli*.		Routine and repeat samples are total coliform-positive and either is *E. coli*-positive or system fails to take repeat samples following *E. coli*-positive routine sample or system fails to analyze total coliform—positive repeat sample for *E. coli*.	0	Human and animal fecal waste	*E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely-compromised immune systems.
† Until December 31, 2015 (March 30, 2016) ‡ Beginning January 1, 2016 (April 1, 2016)						
Fecal Indicators (enterococci or coliphage)	TT		TT	N/A	Human and animal fecal waste	Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems

Total organic carbon (ppm)	TT		TT	N/A	Naturally present in the environment.	Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection by products. These 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
Turbidity (NTU)	TT		TT	N/A	Soil runoff	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
Radioactive contaminants:						
Beta/photon emitters (mrem/yr)	4 mrem/yr		4	0	Decay of natural and man-made deposits	Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta particle and photon radioactivity in excess of the MCL over many years may have an increased risk of getting cancer.

Alpha emitters (pCi/L)	15 pCi/L		15	0	Erosion of natural deposits	Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
Combined radium (pCi/L)	5 pCi/L		5	0	Erosion of natural deposits	Some people who drink water containing radium-226 or -228 in excess of the MCL over many years may have an increased risk of getting cancer.
Uranium (pCi/L)	30 µg/L		30	0	Erosion of natural deposits	Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.
Inorganic contaminants:						
Antimony (ppb)	0.006	1000	6	6	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder.	Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
Arsenic (ppb)	0.010	1000	10	0	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.	Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.
Asbestos (MFL)	7 MFL		7	7	Decay of asbestos cement water mains; Erosion of natural deposits.	Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.

Barium (ppm)	2		2	2	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.	Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
Beryllium (ppb)	0.004	1000	4	4	Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries.	Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions
Bromate (ppb)	0.010	1000	10	0	By-product of drinking water disinfection.	Some people who drink water of containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.
Cadmium (ppb)	0.005	1000	5	5	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; Runoff from waste batteries and paints.	Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.
Chloramines (ppm)	MRDL=4		MRDL=4	MRDLG=4	Water additive used to control microbes.	Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia.

Chlorine (ppm)	MRDL=4		MRDL=4	MRDLG=4	Water additive used to control microbes.	Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort.
Chlorine dioxide (ppb)	MRDL=0.8	1000	MRDL=800	MRDLG=800	Water additive used to control microbes.	Some infants and young children who drink water chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia.
Chlorite (ppm)	1		1	0.8	By-product of drinking water disinfection.	Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia.
Chromium (ppb)	0.1	1000	100	100	Discharge from steel and pulp mills; Erosion of natural deposits.	Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.

Copper (ppm)	AL=1.3		AL=1.3	1.3	Corrosion of household plumbing systems; Erosion of natural deposits.	Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience 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.
Cyanide (ppb)	0.2	1000	200	200	Discharge from steel/metal factories; Discharge from plastic and fertilizer factories.	Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.
Fluoride (ppm)	2		2	2	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 double the MCL over many years could get bone disease, including pain and tenderness of the bones. Fluoride in drinking water in excess of the MCL but less than twice the MCL may cause mottling of children's teeth, usually in children less than nine years old. Mottling, also known as dental fluorosis, may include brown staining and/or pitting of the teeth, and occurs only in developing teeth before they erupt from the gums.

Lead (ppb)	AL=0.015	1000	AL=15	0	Corrosion of household plumbing systems; Erosion of natural deposits.	Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.
Mercury [inorganic] (ppb)	0.002	1000	2	2	Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland.	Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.
Nickel (ppm)	0.1	1000	100	100	Erosion of natural deposits	Some people who drink water containing nickel well in excess of the MCL over many years could experience heart and liver damage.
Nitrate (ppm)	10		10	10	Runoff from fertilizer use; Leaching from septic tanks, sew age; Erosion of natural deposits.	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.
Nitrite (ppm)	1		1	1	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.

Selenium (ppb)	0.05	1000	50	50	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.	Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.
Thallium (ppb)	0.002	1000	2	0.5	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories.	Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.
Synthetic organic contaminants including pesticides and herbicides:						
2,4-D (ppb)	0.07	1000	70	70	Runoff from herbicide used on row crops.	Some people who drink water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands.
2,4,5-TP [Silvex] (ppb)	0.05	1000	50	50	Residue of banned herbicide	Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.
Acrylamide	TT		TT	0	Added to water during sewage/ wastewater treatment.	Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.

Alachlor (ppb)	0.002	1000	2	0	Runoff from herbicide used on row crops.	Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.
Atrazine (ppb)	0.003	1000	3	3	Runoff from herbicide used on row crops.	Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.
Benzo(a)pyrene [PAH] (ppt)	0.0002	1,000,000	200	0	Leaching from linings of water storage tanks and distribution lines.	Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
Carbofuran (ppb)	0.04	1000	40	40	Leaching of soil fumigant used on rice and alfalfa.	Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.
Chlordane (ppb)	0.002	1000	2	0	Residue of banned termiticide	Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.
Dalapon (ppb)	0.2	1000	200	200	Runoff from herbicide used on rights of way.	Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.

Di(2-ethylhexyl) adipate (ppb)	0.4	1000	400	400	Discharge from chemical factories.	Some people who drink water containing di(2-ethylhexyl) adipate well in excess of the MCL over many years could experience toxic effects such as weight loss, liver enlargement or possible reproductive difficulties.
Di(2-ethylhexyl) phthalate (ppb)	0.006	1000	6	0	Discharge from rubber and chemical factories.	Some people who drink water containing di(2-ethylhexyl)phthalate well in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.
Dibromochloropropane (ppt)	0.0002	1,000,000	200	0	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards.	Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive problems and may have an increased risk of getting cancer.
Dinoseb (ppb)	0.007	1000	7	7	Runoff from herbicide used on soybeans and vegetables.	Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
Diquat (ppb)	0.02	1000	20	20	Runoff from herbicide use	Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.
Dioxin [2,3,7,8-TCDD] (ppq)	0.00000003	1,000,000,000	30	0	Emissions from waste incineration and other combustion; Discharge from chemical factories.	Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.

Endothall (ppb)	0.1	1000	100	100	Runoff from herbicide use	Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.
Endrin (ppb)	0.002	1000	2	2	Residue of banned insecticide	Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.
Epichlorohydrin	TT		TT	0	Discharge from industrial chemical factories; An impurity of some water treatment chemicals.	Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.
Ethylene dibromide (ppt)	0.00005	1,000,000	50	0	Discharge from petroleum refineries.	Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.
Glyphosate (ppb)	0.7	1000	700	700	Runoff from herbicide use	Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.
Heptachlor (ppt)	0.0004	1,000,000	400	0	Residue of banned pesticide	Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.

Heptachlor epoxide (ppt)	0.0002	1,000,000	200	0	Breakdown of heptachlor	Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.
Hexachlorobenzene (ppb)	0.001	1000	1	0	Discharge from metal refineries and agricultural chemical factories.	Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.
Hexachlorocyclopentadiene (ppb)	0.05	1000	50	50	Discharge from chemical factories.	Some people who drink water containing Hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.
Lindane (ppt)	0.0002	1,000,000	200	200	Runoff/leaching from insecticide used on cattle, lumber, gardens.	Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.
Methoxychlor (ppb)	0.04	1000	40	40	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock.	Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
Oxamyl [Vydate] (ppb)	0.2	1000	200	200	Runoff/leaching from insecticide used on apples, potatoes and tomatoes.	Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.

PCBs [Polychlorinated biphenyls] (ppt)	0.0005	1,000,000	500	0	Runoff from landfills; Discharge of waste chemicals.	Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.
Pentachlorophenol (ppb)	0.001	1000	1	0	Discharge from wood preserving factories.	Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer
Picloram (ppb)	0.5	1000	500	500	Herbicide runoff	Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.
Simazine (ppb)	0.004	1000	4	4	Herbicide runoff	Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood
Toxaphene (ppb)	0.003	1000	3	0	Runoff/leaching from insecticide used on cotton and cattle.	Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.
Volatile organic contaminants:						

Benzene (ppb)	0.005	1000	5	0	Discharge from factories; Leaching from gas storage tanks and landfills.	Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.
Carbon tetrachloride (ppb)	0.005	1000	5	0	Discharge from chemical plants and other industrial activities.	Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
Chlorobenzene (ppb)	0.1	1000	100	100	Discharge from chemical and agricultural chemical factories.	Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.
o-Dichlorobenzene (ppb)	0.6	1000	600	600	Discharge from industrial chemical factories.	Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.
p-Dichlorobenzene (ppb)	0.075	1000	75	75	Discharge from industrial chemical factories.	Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.
1,2-Dichloroethane (ppb)	0.005	1000	5	0	Discharge from industrial chemical factories.	Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.

1,1-Dichloroethylene (ppb)	0.007	1000	7	7	Discharge from industrial chemical factories.	Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
cis-1,2-Dichloroethylene (ppb)	0.07	1000	70	70	Discharge from industrial chemical factories.	Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver
trans-1,2-Dichloroethylene (ppb)	0.1	1000	100	100	Discharge from industrial chemical factories.	Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.
Dichloromethane (ppb)	0.005	1000	5	0	Discharge from pharmaceutical and chemical factories.	Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.
1,2-Dichloropropane (ppb)	0.005	1000	5	0	Discharge from industrial chemical factories.	Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
Ethylbenzene (ppb)	0.7	1000	700	700	Discharge from petroleum refineries.	Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
Haloacetic Acids (HAA) (ppb)	0.060	1000	60	N/A	By-product of drinking water disinfection.	Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer

Methyl tert Butyl Ether (MTBE) (ppb)	0.01	1000	10	10	Discharge from petroleum refineries; Leaching from gas storage tanks	Some people who drink water containing MTBE in excess of the MCL over many years may experience problems of the central nervous system, including loss of muscle coordination, tremors, difficulty breathing, and drowsiness.
Styrene (ppb)	0.1	1000	100	100	Discharge from rubber and plastic factories; Leaching from landfills.	Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.
Tetrachloroethylene (ppb)	0.001	1000	1	0	Discharge from factories and dry cleaners.	Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.
1,2,4-Trichlorobenzene (ppb)	0.07	1000	70	70	Discharge from textile-finishing factories.	Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.
1,1,1-Trichloroethane (ppb)	0.2	1000	200	200	Discharge from metal degreasing sites and other factories.	Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.
1,1,2-Trichloroethane (ppb)	0.005	1000	5	3	Discharge from industrial chemical factories.	Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.

Trichloroethylene (ppb)	0.001	1000	1	0	Discharge from metal degreasing sites and other factories.	Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer
TTHMs [Total trihalomethanes] (ppb)	0.10/.080	1000	100/80	N/A	By-product of drinking water disinfection.	Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.
Toluene (ppm)	1		1	1	Discharge from petroleum factories.	Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.
Vinyl Chloride (ppb)	0.001	1000	1	0	Leaching from PVC piping; Discharge from plastics factories.	Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
Xylenes (ppm)	10		10	10	Discharge from petroleum factories; Discharge from chemical factories.	Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.

Key:

AL=Action Level

MCL=Maximum Contaminant Level

MCLG=Maximum Contaminant Level Goal

MFL=million fibers per liter

MRDL=Maximum Residual Disinfectant Level

MRDLG=Maximum Residual Disinfectant Level Goal

mrem/year=millirems per year (a measure of radiation absorbed by the body)

N/A=Not Applicable

NTU=Nephelometric Turbidity Units (a measure of water clarity)

pCi/l=picocuries per liter (a measure of radioactivity)

ppm=parts per million, or milligrams per liter (mg/l)

ppb=parts per billion, or micrograms per liter (µg/l)

ppt=parts per trillion, or nanograms per liter
ppq=parts per quadrillion, or picograms per liter
TT=Treatment Technique

7.0 Microbiological Requirements

7.1 Sampling:

7.1.1 Sampling Sites:

7.1.1.1 Compliance with bacteriological requirements of these Regulations shall be based on examinations of samples collected at sites which are representative of water throughout the distribution system according to a written sample siting plan. These plans are subject to Division review and revision.

7.1.2 CWS Sampling Frequency:

7.1.1.2 The supplier of water for a CWS shall sample for total coliform bacteria at least monthly in numbers proportional to the population served by the system in accordance with the following:

Population Served	Number of Samples Per Month
25-1,000	1
1,001-2,500	2
2,501-3,300	3
3,301-4,100	4
4,101-4,900	5
4,901-5,800	6
5,801-6,700	7
6,701-7,600	8
7,601-8,500	9
8,501-12,900	10
12,901-17,200	15
17,201-21,500	20
21,501-25,000	25
25,001-33,000	30
33,001-41,000	40
41,001-50,000	50
50,001-59,000	60
59,001-70,000	70
70,001-83,000	80
83,001-96,000	90
96,001-130,000	100
130,001-220,000	120

7.1.3 Reduced Monitoring Frequency for CWSs:

7.1.3.1 If a CWS serving twenty-five (25) to one thousand (1000) persons has no history of total coliform contamination in its current configuration and a sanitary survey conducted in the past five (5) years shows that the system is supplied solely by a protected ground water source and is free of sanitary defects, the Division may reduce the monitoring frequency specified above, except that in no case may the Division reduce the monitoring frequency to less than one (1) sample per quarter. The Division must approve the reduced monitoring frequency in writing.

7.1.4 NCWS Sampling Frequency:

7.1.4.1 The supplier of water for a NCWS and NTNCWS shall sample for total coliform bacteria in accordance with the following:

7.1.4.1.1 A NCWS and NTNCWS using only ground water (except ground water under the direct influence of surface water) and serving one thousand (1000) persons or fewer must monitor each calendar quarter that the system provides water to the public, except that the Division may reduce this monitoring frequency, in writing, if a sanitary survey shows that the system is free of sanitary defects. Beginning June 29, 1994 the Division cannot reduce the monitoring frequency for a NCWS using only ground water (except ground water under the direct influence of surface water) and serving one thousand (1000) persons or fewer to less than once per year.

7.1.4.1.2 A NCWS and NTNCWS using only ground water (except ground water under the direct influence of surface water) and serving more than one thousand (1000) persons during any month must monitor at the same frequency as a like-sized CWS, as specified in subsection 7.1.2, except the Division may reduce this monitoring frequency, in writing, for any month the system serves one thousand (1000) persons or fewer. The Division cannot reduce the monitoring frequency to less than once per year. For systems using ground water under the direct influence of surface water, subsection 7.1.4.1.4 applies.

7.1.4.1.3 A NCWS and NTNCWS using surface water, in total or in part, must monitor at the same frequency as a like-sized CWS, as specified in subsection 7.1.2, regardless of the number of persons it serves.

7.1.4.1.4 A NCWS and NTNCWS using ground water under the direct influence of surface water must monitor at the same frequency as a like-sized CWS, as specified in subsection 7.1.2. The system must begin monitoring at this frequency beginning six (6) months after the Division determines that the ground water is under the direct influence of surface water.

7.1.5 Special Sampling for Surface Water Systems: A PWS that uses surface water or ground water under the direct influence of surface water, and does not practice filtration in compliance with subsection 1.1, must collect at least one (1) sample near the first service connection each day the turbidity level of the source water, measured as specified in subsection 7.1.2, exceeds one (1) NTU. This sample must be analyzed for the presence of total coliforms. When one (1) or more turbidity measurements in any day exceed one (1) NTU, the system must collect this coliform sample within twenty-four (24) hours of the first exceedance, unless the Division determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within thirty (30) hours of collection. Sample results from this coliform monitoring must be included in determining the MCL for total coliforms.

7.1.6 Monthly/Quarterly Sampling: The PWS must collect samples at regular time intervals throughout the month/quarter, except that a system that uses only ground water (except ground water under the direct influence of surface water) and serves 4,900 persons or fewer, may collect all required samples on a single day if they are taken from different sites.

7.1.7 Special Purpose Samples: Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for total coliforms. Repeat samples taken pursuant to subsection 7.2.3 are not considered special purpose samples, and must be used to determine compliance with the MCL for total coliforms.

7.2 Microbiological MCLs

7.2.1 Total Coliforms, Fecal Coliforms and *E. coli*:

7.2.1.1 The MCLs for microbiological contaminants are in accordance with the following:

7.2.1.1.1 Until December 31, 2015, compliance with the MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density in accordance with the following:

7.2.1.1.1.1 For a system which collects at least forty (40) samples per month/quarter, if no more than 5.0 percent of the samples collected during a month/quarter are total coliform-positive, the system is in compliance with the MCL for total coliforms.

7.2.1.1.1.2 For a system which collects fewer than forty (40) samples per month/quarter, if no more than one (1) sample collected during a month/quarter is total coliform-positive, the system is in compliance with the MCL for total coliforms.

7.2.1.1.2 Until December 31, 2015 any fecal coliform-positive repeat sample, or *E. coli*-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or *E. coli*-positive routine sample constitutes a violation of the MCL for total coliforms. For purposes

of the public notification requirements in subsection 4.2, this is a violation that may pose an acute risk to health.

7.2.1.1.3 Beginning January 1, 2016, a system is in compliance with the MCL for *E. coli* for samples taken under the provisions of subsection 7.4 unless any of the conditions identified in subsections 7.2.1.1.3.1 through 7.2.1.1.3.4 occur. For purposes of the public notification requirements in Section 4.0, violation of the MCL may pose an acute risk to public health.

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

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

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

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

7.2.1.1.4 Until December 31, 2015, a public water system must determine compliance with the MCL for total coliforms in subsections 7.2.1.11 and 7.2.1.1.2 for each month in which it is required to monitor for total coliforms. Beginning January 1, 2016, a public water system must determine compliance with the MCL for *E. coli* in subsection 7.2.1.1.3 for each month in which it is required to monitor for total coliforms.

7.2.1.1.5 The Administrator, pursuant to section 1412 of the Safe Drinking Water Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the MCL for total coliforms in subsections 7.2.1.1.1 and 7.2.1.1.2 and for achieving compliance with the MCL for *E. coli* in subsection 7.2.1.1.3:

7.2.1.1.5.1 Protection of wells from fecal contamination by coliforms by appropriate placement and construction;

7.2.1.1.5.2 Maintenance of a disinfectant residual throughout the distribution system;

7.2.1.1.5.3 Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, cross connection and control, and continual maintenance of positive water pressure in all parts of the distribution system;

7.2.1.1.5.4 Filtration and/or disinfection of surface water, as described in Sections 16.0, 17.0, 19.0 and 20.0, or disinfection of ground water, as described in Section 8.0, using strong oxidants such as chlorine, chlorine dioxide, or ozone; and

7.2.1.1.5.5 For systems using groundwater, compliance with the requirements of an EPA-approved State Wellhead Protection Program under section 1428 of the Safe Drinking Water Act (SDWA).

7.2.1.1.6 The Administrator, pursuant to section 1412 of the Safe Drinking Water Act, hereby identifies the technology, treatment techniques, or other means available identified in subsection 7.2.1.1.5 as affordable technology, treatment techniques, or other means available to systems serving 10,000 or fewer people for achieving compliance with the MCL for total coliforms in subsections 7.2.1.1.1 and 7.2.1.1.2 and for achieving compliance with the MCL for *E. coli* in subsection 7.2.1.1.3.

7.2.2 Invalidation of Total Coliform-Positive Samples:

7.2.2.1 Each total coliform positive sample counts in compliance calculations, unless it has been invalidated by the Division. Invalidated samples do not count toward the minimum monitoring frequency. The Division may invalidate a sample if:

7.2.2.1.1 The analytical laboratory acknowledges that improper sample analysis caused the positive result;

7.2.2.1.2 A laboratory must invalidate a total coliform sample (unless total coliforms are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g. the Multiple-Tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P-A) Coliform Test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (e.g. Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the system must collect another sample from the same location as the original sample within twenty-four (24) hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The system must continue to re-sample within twenty-four (24) hours and have the samples analyzed until

it obtains a valid result. The Division may waive the twenty-four (24) hour time limit on a case-by-case basis.

7.2.2.1.3 The Division determines that the contamination is a domestic or other non-distribution system plumbing problem on the basis that one (1) or more repeat samples taken at the same tap as the original total coliform positive sample is total coliform positive, but all repeat samples at nearby sampling locations that are within five (5) service connections of the original tap are total coliform negative. A total coliform-positive sample cannot be invalidated under this provision if the PWS has only one (1) service connection; or

7.2.2.1.4 The Division has substantial grounds to believe that a total coliform positive result is due to some circumstance or condition which does not reflect water quality in the distribution system, if:

7.2.2.1.4.1 The basis for this determination is documented in writing.

7.2.2.1.4.2 This document is signed and approved by the Division.

7.2.2.1.4.3 The documentation is made available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take, to correct this problem.

7.2.2.1.4.4 The system must still collect all repeat samples required under subsection 7.2.3 to determine compliance with the MCL for total coliforms in subsection 7.2.1.

7.2.3 Repeat Monitoring:

7.2.3.1 When a total coliform-positive sample result is obtained, repeat sampling must be done in accordance with the following:

7.2.3.1.1 If a routine sample is total-coliform positive, the PWS must collect a set of repeat samples within twenty-four (24) hours of being notified of the positive result. A system which collects more than one (1) routine sample/month must collect no fewer than three (3) repeat samples for each total coliform positive sample found. A system which collects one (1) routine sample/ month or fewer must collect no fewer than four (4) repeat samples for each total coliform positive sample found. The Division may extend the twenty-four (24) hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within twenty-four hours that is beyond its control. In the case of an extension, the Division must specify how much time the system has to collect the repeat samples.

7.2.3.1.2 The system must collect at least one (1) repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one (1) repeat sample at a tap within five (5) service connections upstream and at least one (1) repeat sample at a tap within five (5) service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the distribution system, or one (1) away from the end of the distribution system, the Division may waive the requirement to collect at least one (1) repeat sample upstream or downstream of the original sampling site.

7.2.3.1.3 The system must collect all repeat samples on the same day, except that the Division may allow a system with a single service connection to collect the required set of repeat samples over a four (4) day period or to collect a larger volume repeat sample(s) in one (1) or more sample containers of any size, as long as the total volume collected is at least four hundred (400) ml [three hundred (300) ml for systems which collect more than one (1) routine sample/ month].

7.2.3.1.4 If one (1) or more repeat samples in the set is total coliform-positive, the PWS must collect an additional set of repeat samples in the manner specified in subsections 7.2.1, 7.2.2, and 7.2.3. The additional samples must be collected within twenty-four (24) hours of being notified of the positive result, unless the Division extends the limit as provided in subsection 7.2.1. The system must repeat this process until either total coliforms are not detected in one (1) complete set of repeat samples or the system determines that the MCL for total coliforms in subsection 7.2.1 has been exceeded and notifies the Division.

7.2.3.1.5 If a system collecting fewer than five (5) routine samples per month has one (1) or more total coliform-positive samples and the Division does not invalidate the sample(s) under subsection 7.2.2, it must collect at least five (5) routine samples during the next month the system provides water to the public, except that the Division may waive this requirement if the conditions of subsections 7.2.3.1.5.1 and 7.2.3.1.5.2 are met. The Division cannot waive the requirement for a system to collect repeat samples in subsections 7.2.3.1.1, 7.2.3.1.2, 7.2.3.1.3, and 7.2.3.1.4.

7.2.3.1.5.1 The Division may waive the requirements to collect five (5) routine samples the next month the system provides water to the public if the Division, or an agent approved by the Division, performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Division to determine whether additional monitoring and/or any corrective action is needed. The Division cannot approve an employee of the system to perform the site visit, even if the employee is an agent approved by the Division to perform sanitary surveys.

7.2.3.1.5.2 The Division may waive the requirements to collect five (5) routine samples the next month the system provides water to the public if the Division has determined why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. In this case, the Division must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the Division official who recommends such a decision, and make this document available to the EPA and the public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem. The Division cannot waive the requirement to collect five (5) routine samples the next month the system provides water to the public solely on the grounds that all coliform samples are total coliform-negative. Under this paragraph, a system must still take at least one (1) routine sample before the end of the next month it serves water to the public and use it to determine compliance with the MCL for total coliforms in subsection 7.2.1, unless the Division has determined that the system has corrected the contamination problem before the system took the set of repeat samples required in subsections 7.2.3.1.1, 7.2.3.1.2, 7.2.3.1.3, and 7.2.3.1.4, and all repeat samples were total coliform negative.

7.2.3.1.6 After a systems collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five (5) adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the system may count the subsequent sample(s) as a repeat sample instead of a routine sample.

7.2.3.1.7 Results of all routine and repeat samples not invalidated by the Division must be included in determining compliance with the MCL for total coliforms in subsection 7.2.1.

7.2.4 Initial/Subsequent Sanitary Surveys: PWSs which do not collect five (5) or more routine samples/month must undergo an initial sanitary survey by June 29, 1994 for CWSs and June 29, 1999 for NCWSs. Thereafter, systems must undergo another sanitary survey every five (5) years, except that NCWSs using only protected and disinfected ground water, as defined by the Division, must undergo subsequent sanitary surveys at least every ten (10) years after the initial sanitary survey. The Division must review the results of each sanitary survey to determine whether the existing monitoring frequency is adequate and what additional measures, if any, the system needs to undertake to improve drinking water quality. In conducting a sanitary survey of a system using ground water in a State having an EPA-approved wellhead protection program under section 1428 of the SDWA, information on sources of contamination within the delineated wellhead protection area that was collected in the course of developing and implementing the program should be considered instead of collecting new information, if the information was collected since the last time the system was subject to a sanitary survey. Sanitary surveys must be performed by the Division and the system is responsible for ensuring the survey takes place.

7.2.5 Fecal Coliforms/Escherichia coli (E. coli) Testing:

7.2.5.1 When a total coliform-positive sample result is obtained, the sample must be analyzed for fecal coliforms or E. coli in accordance with the following:

7.2.5.1.1 If any routine or repeat sample is total coliform- positive, the system must analyze that total coliform-positive culture medium to determine if fecal coliforms are present, except that the system may test for E. coli in lieu of fecal coliforms. If fecal coliforms or E. coli are present, the system shall notify the Division by the end of the day when the system is notified of the test result, unless the system is notified of the result after the Division office is closed, in which case the system shall notify the Division before the end of the next business day.

7.2.5.1.2 The Division has the discretion to allow the PWS, on a case by case basis, to forgo fecal coliform or E. coli testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is fecal coliform-positive or E. coli positive. Accordingly, the system shall notify the Division as specified in subsection 7.2.1.1.1 and the provisions of subsection 7.2.1.1.2 apply.

7.2.6 Response to Violation. A PWS which has exceeded the MCL for total coliforms in subsection 7.2.1 must report the violation to the Division no later than the end of the next business day after it learns of the violation, and notify the public in accordance with subsection 4.1. A PWS which has failed to comply with a coliform monitoring requirement, including the sanitary survey requirement, must report the monitoring violation to the Division within ten (10) days after the system discovers the violation, and notify the public in accordance with subsection 4.1.

7.2.7 The provisions of subsections 7.1.1 and 7.2.4 are applicable until December 31, 2015. The provisions of subsections 7.2.2, 7.2.3, 7.2.5, 7.3 and 7.2.6 are applicable until all required repeat monitoring under subsection 7.2.3 and fecal coliform or *E. coli* testing under subsection 7.2.5 that was initiated by a total coliform-positive sample taken before January 1, 2016 is completed, as well as analytical method, reporting, recordkeeping, public notification, and consumer confidence report requirements associated with that monitoring and testing. Beginning January 1, 2016, the provisions of subsection 7.4 are applicable, with systems required to begin regular monitoring at the same frequency as the system-specific frequency required on December 31, 2015.

7.3 Analytical Requirements

7.3.1 Analytical Methodology. The standard sample volume required for total coliform analysis, regardless of analytical method used, is one hundred (100) ml. Public water systems need only determine the presence or absence of total coliforms. A determination of total coliform density is not required. Public water systems must conduct total coliform analyses in accordance with 40 CFR 141.21(f)(3). Copies may be obtained from the Office of Drinking Water.

7.4 Revised Total Coliform Rule

7.4.1 General.

7.4.1.1 General. The provisions of this subpart include both maximum contaminant level and treatment technique requirements.

7.4.1.2 Applicability. The provisions of this subpart apply to all public water systems.

7.4.1.3 Compliance date. Systems must comply with the provisions of this subpart beginning January 1, 2016, unless otherwise specified in this subpart.

7.4.1.4 Implementation with EPA as State. Systems falling under direct oversight of EPA, where EPA acts as the State, must comply with decisions made by EPA for implementation of subpart Y. EPA has authority to establish such procedures and criteria as are necessary to implement subpart Y.

7.4.1.5 Violations of national primary drinking water regulations. Failure to comply with the applicable requirements of §§141.851 through 141.861, including requirements established by the State pursuant to these provisions, is a violation of the national primary drinking water regulations under subpart Y.

7.4.2 Analytical methods and laboratory certification.

7.4.2.1 Analytical methodology.

7.4.2.1.1 The standard sample volume required for analysis, regardless of analytical method used, is 100 ml.

7.4.2.1.2 Systems need only determine the presence or absence of total coliforms and E. coli; a determination of density is not required.

7.4.2.1.3 The time from sample collection to initiation of test medium incubation may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10 deg. C during transit.

7.4.2.1.4 If water having residual chlorine (measured as free, combined, or total chlorine) is to be analyzed, sufficient sodium thiosulfate ($Na_2S_2O_3$) must be added to the sample bottle before sterilization to neutralize any residual chlorine in the water sample. Dechlorination procedures are addressed in Section 9060A.2 of Standard Methods for the Examination of Water and Wastewater (20th and 21st editions).

7.4.2.1.5 Systems must conduct total coliform and E. coli analyses in accordance with one of the analytical methods in the following table or one of the alternative methods listed in Appendix A subsection 7.4.2

Organism	Methodology category	Method[1]	Citation[1]

Total Coliforms	Lactose Fermentation Methods	Standard Total Coliform Fermentation Technique	Standard Methods 9221 B.1, B.2 (20th ed.; 21st ed.)[2 3] Standard Methods Online 9221 B.1, B.2–99[2 3]
		Presence-Absence (P–A) Coliform Test.	Standard Methods 9221 D.1, D.2 (20th ed.; 21st ed.)[2 7] Standard Methods Online 9221 D.1, D.2–99[2 7]
	Membrane Filtration Methods	Standard Total Coliform Membrane Filter Procedure.	Standard Methods 9222 B, C (20th ed.; 21st ed.)[2 4]
			Standard Methods Online 9222 B–97 2 4, 9222 C–97[2 4]
		Membrane Filtration using MI medium. m-ColiBlue24R Test 2 4 Chromocult[2 4]	EPA Method 1604[2]
	Enzyme Substrate Methods	Colilert®	Standard Methods 9223 B (20th ed.; 21st ed.)[2 5]
		Standard Methods Online 9223 B–97[2 5] Colisure® E*Colite® Test[2] Readycult® Test[2] modified Colitag® Test[2]	Standard Methods 9223 B (20th ed.; 21st ed.)[2 5 6] Standard Methods Online 9223 B–97[2 5 6]
Escherichia coli	*Escherichia coli* Procedure (following Lactose Fermentation Methods). *Escherichia coli* Partition Method	EC–MUG medium	Standard Methods 9221 F.1 (20th ed.; 21st ed.)[2]
		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.1*c*(1) (20th ed.; 21st ed.)[2]
	Membrane Filtration Methods	Membrane Filtration using MI medium.	EPA Method 1604[2]
		m-ColiBlue24® Test[2 4]	
		Chromocult[2 4]	
	Enzyme Substrate Methods	Colilert®	Standard Methods 9223 B (20th ed.; 21st ed.)[2 5] Standard Methods Online 9223 B–97[2 5 6]

		Colisure® E*Colite® Test[2] Readycult® Test[2] modified Colitag® Test[2]	Standard Methods 9223 B (20th ed.; 21st ed.)[2 5 6] Standard Methods Online 9223 B–97[2 5 6]

[1] The procedures must be done in accordance with the documents listed in subsection 7.4.2.3 **[~~of this section~~]**. For Standard Methods, either editions, 20th (1998) or 21st (2005), may be used. For the Standard Methods Online, the year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions that may be used. For vendor methods, the date of the method listed in subsection 7.4.2.3 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 subsection 7.4.2.3.

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

[4] All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series. Alternatively, membrane filtration equipment that is 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 this regulation.

[6] ColisureR 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, KH2PO4, must be 1.5g, and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

7.4.2.2 Laboratory certification. Systems must have all compliance samples required under this subpart analyzed by a laboratory certified by the EPA or a primacy State to analyze drinking water samples. The laboratory used by the system must be certified for each method (and associated contaminant(s)) used for compliance monitoring analyses under this rule.

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

7.4.2.3.1 American Public Health Association, 800 I Street, NW., Washington, DC 20001.

7.4.2.3.1.1 ‘‘Standard Methods for the Examination of Water and Wastewater,’’ 20th edition (1998):

7.4.2.3.1.1.1 Standard Methods 9221, ‘‘Multiple-Tube Fermentation Technique for Members of the Coliform Group,’’ B.1, B.2, ‘‘Standard Total Coliform Fermentation Technique.’’

7.4.2.3.1.1.2 Standard Methods 9221, ''Multiple-Tube Fermentation Technique for Members of the Coliform Group,'' D.1, D.2, ''Presence-Absence (P–A) Coliform Test.''

7.4.2.3.1.1.3 Standard Methods 9222, ''Membrane Filter Technique for Members of the Coliform Group,'' B, ''Standard Total Coliform Membrane Filter Procedure.''

7.4.2.3.1.1.4 Standard Methods 9222, ''Membrane Filter Technique for Members of the Coliform Group,'' C, ''Delayed-Incubation Total Coliform Procedure.''

7.4.2.3.1.1.5 Standard Methods 9223, ''Enzyme Substrate Coliform Test,'' B, ''Enzyme Substrate Test,'' Colilert® and Colisure®.

7.4.2.3.1.1.6 Standard Methods 9221, ''Multiple Tube Fermentation Technique for Members of the Coliform Group,'' F.1, ''Escherichia coli Procedure: EC–MUG medium.''

7.4.2.3.1.1.7 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).''

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

7.4.2.3.1.2 ''Standard Methods for the Examination of Water and Wastewater,'' 21st edition (2005):

7.4.2.3.1.2.1 Standard Methods 9221, ''Multiple-Tube Fermentation Technique for Members of the Coliform Group,'' B.1, B.2, ''Standard Total Coliform Fermentation Technique.''

7.4.2.3.1.2.2 Standard Methods 9221, ''Multiple-Tube Fermentation Technique for Members of the Coliform Group,'' D.1, D.2, ''Presence-Absence (P–A) Coliform Test.''

7.4.2.3.1.2.3 Standard Methods 9222, ''Membrane Filter Technique for Members of the Coliform Group,'' B, ''Standard Total Coliform Membrane Filter Procedure.''

7.4.2.3.1.2.4 Standard Methods 9222, ''Membrane Filter Technique for Members of the Coliform Group,'' C, ''Delayed-Incubation Total Coliform Procedure.''

7.4.2.3.1.2.5 Standard Methods 9223, ''Enzyme Substrate Coliform Test,'' B, ''Enzyme Substrate Test,'' Colilert® and Colisure®.

7.4.2.3.1.2.6 Standard Methods 9221, ''Multiple Tube Fermentation Technique for Members of the Coliform Group,'' F.1, ''Escherichia coli Procedure: EC–MUG medium.''

7.4.2.3.1.2.7 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).''

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

7.4.2.3.1.3 ''Standard Methods Online'' available at http://www.standardmethods.org:

7.4.2.3.1.3.1 Standard Methods Online 9221, ''Multiple-Tube Fermentation Technique for Members of the Coliform Group'' (1999), B.1, B.2–99, ''Standard Total Coliform Fermentation Technique.''

7.4.2.3.1.3.2 Standard Methods Online 9221, ''Multiple-Tube Fermentation Technique for Members of the Coliform Group'' (1999), D.1, D.2–99, ''Presence-Absence (P–A) Coliform Test.''

7.4.2.3.1.3.3 Standard Methods Online 9222, ''Membrane Filter Technique for Members of the Coliform Group'' (1997), B–97, ''Standard Total Coliform Membrane Filter Procedure.''

7.4.2.3.1.3.4 Standard Methods Online 9222, ''Membrane Filter Technique for Members of the Coliform Group'' (1997), C–97, ''Delayed-Incubation Total Coliform Procedure.''

7.4.2.3.1.3.5 Standard Methods Online 9223, ''Enzyme Substrate Coliform Test'' (1997), B–97, ''Enzyme Substrate Test'', Colilert® and Colisure®.

7.4.2.3.2 Charm Sciences, Inc., 659 Andover Street, Lawrence, MA 01843–1032, telephone 1–800–343–2170:

7.4.2.3.2.1 E*Colite®—''Charm E*ColiteTM Presence/Absence Test for Detection and Identification of Coliform Bacteria and Escherichia coli in Drinking Water,'' January 9, 1998.

7.4.2.3.2.2 Reserved

7.4.2.3.3 CPI International, Inc., 5580 Skylane Blvd., Santa Rosa, CA, 95403, telephone 1–800–878–7654:

7.4.2.3.3.1 modified Colitag®, ATP D05–0035—''Modified ColitagTM Test Method for the Simultaneous Detection of E. coli and other Total Coliforms in Water,'' August 28, 2009.

7.4.2.3.3.2 Reserved

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

7.4.2.3.4.1 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.

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

7.4.2.3.5 EPA's Water Resource Center (MC–4100T), 1200 Pennsylvania Avenue NW., Washington, DC 20460, telephone 1–202–566–1729:

7.4.2.3.5.1 EPA Method 1604, EPA 821–R–02–024—"EPA Method 1604: Total Coliforms and Escherichia coli in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium)," September 2002, http://www.epa.gov/nerlcwww/1604sp02.pdf.

7.4.2.3.5.2 Reserved

7.4.2.3.6 Hach Company, P.O. Box 389, Loveland, CO 80539, telephone 1–800–604–3493:

7.4.2.3.6.1 m-ColiBlue24®—"Membrane Filtration Method m-ColiBlue24® Broth," Revision 2, August 17, 1999.

7.4.2.3.6.2 Reserved

7.4.3 General monitoring requirements for all public water systems.

7.4.3.1 Sample siting plans.

7.4.3.1.1 Systems must develop a written sample siting plan that identifies sampling sites and a sample collection schedule that are representative of water throughout the distribution system not later than December 31, 2015. These plans are subject to Division review and revision. Systems must collect total coliform samples according to the written sample siting plan. Monitoring required by 7.4.4 through 7.4.8 may take place at a customer's premise, dedicated sampling station, or other designated compliance sampling location. Routine and repeat sample sites and any sampling points necessary to meet the requirements of subpart S must be reflected in the sampling plan.

7.4.3.1.2 Systems must collect samples at regular time intervals throughout the month, except that systems that use only ground water and serve 4,900 or fewer people may collect all required samples on a single day if they are taken from different sites.

7.4.3.1.3 Systems must take at least the minimum number of required samples even if the system has had an E. coli MCL violation or has exceeded the coliform treatment technique triggers in subsection 7.4.9.1.

7.4.3.1.4 A system may conduct more compliance monitoring than is required by this subpart to investigate potential problems in the distribution system and use monitoring as a tool to assist in uncovering problems. A system may take more than the minimum number of required routine samples and must include the results in calculating whether the coliform treatment technique trigger in subsections 7.4.9.1.1.1 and 7.4.9.1.1.2 has been exceeded only if the samples are taken in accordance with the existing sample siting plan and are representative of water throughout the distribution system.

7.4.3.1.5 Systems must identify repeat monitoring locations in the sample siting plan. Unless the provisions of subsections 7.4.3.1.5.1 or 7.4.3.1.5.2 are met, the system must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the distribution system, or one service connection away from the end of the distribution system, the system must still take all required repeat samples. However, the Division may allow an alternative sampling location in lieu of the requirement to collect at least one repeat sample upstream or downstream of the original sampling site. Except as provided for in subsection 7.4.3.1.5.2, systems required to conduct triggered source water monitoring under subsection 8.3.1 must take ground water source sample(s) in addition to repeat samples required under this subpart.

7.4.3.1.5.1 Systems may propose repeat monitoring locations to the Division that the system believes to be representative of a pathway for contamination of the distribution system. A system may elect to specify either alternative fixed locations or criteria for selecting repeat sampling sites

on a situational basis in a standard operating procedure (SOP) in its sample siting plan. The system must design its SOP to focus the repeat samples at locations that best verify and determine the extent of potential contamination of the distribution system area based on specific situations. The Division may modify the SOP or require alternative monitoring locations as needed.

7.4.3.1.5.2 Ground water systems serving 1,000 or fewer people may propose repeat sampling locations to the Division that differentiate potential source water and distribution system contamination(e.g., by sampling at entry points to the distribution system). A ground water system with a single well required to conduct triggered source water monitoring may, with written Division approval, take one of its repeat samples at the monitoring location required for triggered source water monitoring under subsection 8.3.1 if the system demonstrates to the Division's satisfaction that the sample siting plan remains representative of water quality in the distribution system. If approved by the Division, the system may use that sample result to meet the monitoring requirements in both subsection 8.3.1 and this section.

7.4.3.1.5.2.1 If a repeat sample taken at the monitoring location required for triggered source water monitoring is E. coli-positive, the system has violated the E. coli MCL and must also comply with subsection 8.3.1.2.3. If a system takes more than one repeat sample at the monitoring location required for triggered source water monitoring, the system may reduce the number of additional source water samples required under subsection 8.3.1.2.3 by the number of repeat samples taken at that location that were not E. coli-positive.

7.4.3.1.5.2.2 If a system takes more than one repeat sample at the monitoring location required for triggered source water monitoring under subsection 8.3.1, and more than one repeat sample is E. coli positive, the system has violated the E. coli MCL and must also comply with subsection 8.4.1.

7.4.3.1.5.2.3 If all repeat samples taken at the monitoring location required for triggered source water monitoring are E. coli-negative and a repeat sample taken at a monitoring location other than the one required for triggered source water monitoring is E. coli-positive, the system has violated the E. coli MCL, but is not required to comply with subsection 8.3.1.2.3.

7.4.3.1.6 States may review, revise, and approve, as appropriate, repeat sampling proposed by systems under subsections 7.4.3.1.5.1 and 7.4.3.1.5.2. The system must demonstrate that the sample siting plan remains representative of the water quality in the distribution system. The Division may determine that monitoring at the entry point to the distribution system (especially for undisinfected ground water systems) is effective to differentiate between potential source water and distribution system problems.

7.4.3.2 Special purpose samples. Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, must not be used to determine whether the coliform treatment technique trigger has been exceeded. Repeat samples taken pursuant to subsection 7.4.8 are not considered special purpose samples, and must be used to determine whether the coliform treatment technique trigger has been exceeded.

7.4.3.3 Invalidation of total coliform samples. A total coliform-positive sample invalidated under subsection 7.4.3.3 does not count toward meeting the minimum monitoring requirements of this subpart.

7.4.3.3.1 The Division may invalidate a total coliform-positive sample only if the conditions of subsection**[s]** 7.4.3.3.1.1, 7.4.3.3.1.2 or 7.4.3.3.1.3 are met.

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

7.4.3.3.1.2 The Division, on the basis of the results of repeat samples collected as required under subsection 7.4.8.1, determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The Division cannot invalidate a sample on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform positive sample are also total coliform positive, and all repeat samples collected at a location other than the original tap are total coliform-negative (e.g., a State cannot invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the system has only one service connection).

7.4.3.3.1.3 The Division has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition that does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required under subsection 7.4.8.1, and use them to determine whether a coliform treatment technique trigger in subsection 7.4.9

has been exceeded. To invalidate a total coliform-positive sample under this paragraph, the decision and supporting rationale must be documented in writing, and approved and signed by the supervisor of the Division official who recommended the decision. The Division must make this document available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take, to correct this problem. The Division may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform negative.

7.4.3.3.2 A laboratory must invalidate a total coliform sample (unless total coliforms are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the Multiple-Tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P–A) Coliform Test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (e.g., Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The Division may waive the 24-hour time limit on a case-by-case basis. Alternatively, the Division may implement criteria for waiving the 24-hour sampling time limit to use in lieu of case-by-case extensions.

7.4.4 Routine monitoring requirements for non-community water systems serving 1,000 or fewer people using only ground water.

7.4.4.1 General.

7.4.4.1.1 The provisions of this section apply to non-community water systems using only ground water (except ground water under the direct influence of surface water, as defined in Section 2.0) and serving 1,000 or fewer people.

7.4.4.1.2 Following any total coliform positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and E. coli analytical requirements in subsection 7.4.8.

7.4.4.1.3 Once all monitoring required by this section and subsection 7.4.8 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in subsection 7.4.9 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by subsection 7.4.9.

7.4.4.1.4 For the purpose of determining eligibility for remaining on or qualifying for quarterly monitoring under the provisions of subsection 7.4.4.6.4 and 7.4.4.7.2, respectively, for transient non-community water systems, the Division may elect to not count monitoring violations under subsection 7.4.10.3.1 if the missed sample is collected no later than the end of the monitoring period following the monitoring period in which the sample was missed. The system must collect the make-up sample in a different week than the routine sample for that monitoring period and should collect the sample as soon as possible during the monitoring period. The Division may not use this provision under subsection 7.4.4.8. This authority does not affect the provisions of subsections 7.4.10.3.1 and 7.4.11.1.4.

7.4.4.2 Monitoring frequency for total coliforms. Systems must monitor each calendar quarter that the system provides water to the public, except for seasonal systems or as provided under subsections 7.4.4.3 through 7.4.4.8 and 7.4.4.10. Seasonal systems must meet the monitoring requirements of subsection 7.4.4.9.

7.4.4.3 Transition to subsection 7.4 (Revised Total Coliform Rule).

7.4.4.3.1 Systems, including seasonal systems, must continue to monitor according to the total coliform monitoring schedules under subsection 7.1 that were in effect on December 31, 2015, unless any of the conditions for increased monitoring in subsection 7.4.4.6 are triggered on or after January 1, 2016, or unless otherwise directed by the Division.

7.4.4.3.2 Beginning January 1, 2016, the Division must perform a special monitoring evaluation during each sanitary survey to review the status of the system, including the distribution system, to determine whether the system is on an appropriate monitoring schedule. After the Division has performed the special monitoring evaluation during each sanitary survey, the Division may modify the system's monitoring schedule, as necessary, or it may allow the system to stay on its existing monitoring schedule, consistent with the provisions of this section. The Division may not allow systems to begin less frequent monitoring under the special monitoring

evaluation unless the system has already met the applicable criteria for less frequent monitoring in this section. For seasonal systems on quarterly or annual monitoring, this evaluation must include review of the approved sample siting plan, which must designate the time period(s) for monitoring based on site-specific considerations (e.g., during periods of highest demand or highest vulnerability to contamination). The seasonal system must collect compliance samples during these time periods.

7.4.4.4 Annual site visits. Beginning no later than calendar year 2017, systems on annual monitoring, including seasonal systems, must have an initial and recurring annual site visit by the Division that is equivalent to a Level 2 assessment or an annual voluntary Level 2 assessment that meets the criteria in subsection 7.4.9.2 to remain on annual monitoring. The periodic required sanitary survey may be used to meet the requirement for an annual site visit for the year in which the sanitary survey was completed.

7.4.4.5 Criteria for annual monitoring. Beginning January 1, 2016, the Division may reduce the monitoring frequency for a well-operated ground water system from quarterly routine monitoring to no less than annual monitoring, if the system demonstrates that it meets the criteria for reduced monitoring in subsections 7.4.4.5.1 through 7.4.4.5.3, except for a system that has been on increased monitoring under the provisions of subsection 7.4.4.6. A system on increased monitoring under subsection 7.4.4.6 must meet the provisions of subsection 7.4.4.7 to go to quarterly monitoring and must meet the provisions of subsection 7.4.4.8 to go to annual monitoring.

7.4.4.5.1 The system has a clean compliance history for a minimum of 12 months;

7.4.4.5.2 The most recent sanitary survey shows that the system is free of sanitary defects or has corrected all identified sanitary defects, has a protected water source, and meets approved construction standards; and

7.4.4.5.3 The Division has conducted an annual site visit within the last 12 months and the system has corrected all identified sanitary defects. The system may substitute a Level 2 assessment that meets the criteria in subsection 7.4.9.2 for the Division's annual site visit.

7.4.4.6 Increased Monitoring Requirements for systems on quarterly or annual monitoring. A system on quarterly or annual monitoring that experiences any of the events identified in subsections 7.4.4.6.1 through 7.4.4.6.4 must begin monthly monitoring the month following the event. A system on annual monitoring that experiences the event identified in subsection 7.4.4.6.5 must begin quarterly monitoring the quarter following the event. The system must continue monthly or quarterly monitoring until the requirements in subsection 7.4.4.7 for quarterly monitoring or subsection 7.4.4.8 for annual monitoring are met. A system on monthly monitoring for reasons other than those identified in subsections 7.4.4.6.1 through 7.4.4.6.4 is not considered to be on increased monitoring for the purposes of subsections 7.4.4.7 and 7.4.4.8.

7.4.4.6.1 The system triggers a Level 2 assessment or two Level 1 assessments under the provisions of subsection 7.4.9 in a rolling 12-month period.

7.4.4.6.2 The system has an E. coli MCL violation.

7.4.4.6.3 The system has a coliform treatment technique violation.

7.4.4.6.4 The system has two subsection 7.4 monitoring violations or one subsection 7.4 monitoring violation and one Level 1 assessment under the provisions of subsection 7.4.9 in a rolling 12-month period for a system on quarterly monitoring.

7.4.4.6.5 The system has one subsection 7.4 monitoring violation for a system on annual monitoring.

7.4.4.7 Requirements for returning to quarterly monitoring. The Division may reduce the monitoring frequency for a system on monthly monitoring triggered under 7.4.4.6 to quarterly monitoring if the system meets the criteria in subsections 7.4.4.7.1 and 7.4.4.7.2.

7.4.4.7.1 Within the last 12 months, the system must have a completed sanitary survey or a site visit by the Division or a voluntary Level 2 assessment by a party approved by the Division, be free of sanitary defects, and have a protected water source; and

7.4.4.7.2 The system must have a clean compliance history for a minimum of 12 months.

7.4.4.8 Requirements for systems on increased monitoring to qualify for annual monitoring. The Division may reduce the monitoring frequency for a system on increased monitoring under subsection 7.4.4.6 if the system meets the criteria in subsection 7.4.4.7 plus the criteria in subsections 7.4.4.8.1 and 7.4.4.8.2.

7.4.4.8.1 An annual site visit by the Division and correction of all identified sanitary defects. The system may substitute a voluntary Level 2 assessment by a party approved by the Division for the Division's annual site visit in any given year.

7.4.4.8.2 The system must have in place or adopt one or more additional enhancements to the water system barriers to contamination in subsections 7.4.4.8.2.1 through 7.4.4.8.2.5.

7.4.4.8.2.1 Cross connection control, as approved by the Division.

7.4.4.8.2.2 An operator certified by the Division or regular visits by a circuit rider certified by the Division.

7.4.4.8.2.3 Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the Division.

7.4.4.8.2.4 Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under subsection 8.4.2.3.

7.4.4.8.2.5 Other equivalent enhancements to water system barriers as approved by the Division.

7.4.4.9 Seasonal systems.

7.4.4.9.1 Beginning January 1, 2016, all seasonal systems must demonstrate completion of a Division-approved start-up procedure, which may include a requirement for startup sampling prior to serving water to the public.

7.4.4.9.2 A seasonal system must monitor every month that it is in operation unless it meets the criteria in subsections 7.4.4.9.2.1 through 7.4.4.9.2.3 to be eligible for monitoring less frequently than monthly beginning January 1, 2016, except as provided under subsection 7.4.4.3.

7.4.4.9.2.1 Seasonal systems monitoring less frequently than monthly must have an approved sample siting plan that designates the time period for monitoring based on site-specific considerations (e.g., during periods of highest demand or highest vulnerability to contamination). Seasonal systems must collect compliance samples during this time period.

7.4.4.9.2.2 To be eligible for quarterly monitoring, the system must meet the criteria in subsection 7.4.4.7.

7.4.4.9.2.3 To be eligible for annual monitoring, the system must meet the criteria under subsection 7.4.4.8.

7.4.4.9.3 The Division may exempt any seasonal system from some or all of the requirements for seasonal systems if the entire distribution system remains pressurized during the entire period that the system is not operating, except that systems that monitor less frequently than monthly must still monitor during the vulnerable period designated by the Division.

7.4.4.10 Additional routine monitoring the month following a total coliform positive sample. Systems collecting samples on a quarterly or annual frequency must conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). Systems must collect at least three routine samples during the next month, except that the Division may waive this requirement if the conditions of subsections 7.4.4.10.1, 7.4.4.10.2 or 7.4.4.10.3 are met. Systems may either collect samples at regular time intervals throughout the month or may collect all required routine samples on a single day if samples are taken from different sites. Systems must use the results of additional routine samples in coliform treatment technique trigger calculations under subsection 7.4.9.1.

7.4.4.10.1 The Division may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the Division, or an agent approved by the Division, performs a site visit before the end of the next month in which the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Division to determine whether additional monitoring and/or any corrective action is needed. The Division cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the Division to perform sanitary surveys.

7.4.4.10.2 The Division may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the Division has determined why the sample was total coliform-positive and has established that the system has corrected the problem or will correct the problem before the end of the next month in which the system serves water to the public. In this case, the Division must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the Division official who recommends such a decision, and make this document available to the EPA and public. The written documentation must describe the specific cause

of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem.

7.4.4.10.3 The Division may not waive the requirement to collect three additional routine samples the next month in which the system provides water to the public solely on the grounds that all repeat samples are total coliform negative. If the Division determines that the system has corrected the contamination problem before the system takes the set of repeat samples required in subsection 7.4.8, and all repeat samples were total coliform-negative, the Division may waive the requirement for additional routine monitoring the next month.

7.4.5 Routine monitoring requirements for community water systems serving 1,000 or fewer people using only ground water.

7.4.5.1 General.

7.4.5.1.1 The provisions of this section apply to community water systems using only ground water (except ground water under the direct influence of surface water, as defined in Section 2.0) and serving 1,000 or fewer people.

7.4.5.1.2 Following any total coliform positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and E. coli analytical requirements in subsection 7.4.8.

7.4.5.1.3 Once all monitoring required by this section and subsection 7.4.8 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in subsection 7.4.9 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by subsection 7.4.9.

7.4.5.2 Monitoring frequency for total coliforms. The monitoring frequency for total coliforms is one sample/month, except as provided for under subsections 7.4.5.3 through 7.4.5.6.

7.4.5.3 Transition to subsection 7.4.

7.4.5.3.1 All systems must continue to monitor according to the total coliform monitoring schedules under subsection 7.1 that were in effect on December 31, 2015, unless any of the conditions in subsection 7.4.5.5 are triggered on or after January 1, 2016, or unless otherwise directed by the Division.

7.4.5.3.2 Beginning January 1, 2016, the Division must perform a special monitoring evaluation during each sanitary survey to review the status of the system, including the distribution system, to determine whether the system is on an appropriate monitoring schedule. After the Division has performed the special monitoring evaluation during each sanitary survey, the Division may modify the system's monitoring schedule, as necessary, or it may allow the system to stay on its existing monitoring schedule, consistent with the provisions of this section. The Division may not allow systems to begin less frequent monitoring under the special monitoring evaluation unless the system has already met the applicable criteria for less frequent monitoring in this section.

7.4.5.4 Criteria for reduced monitoring.

7.4.5.4.1 The Division may reduce the monitoring frequency from monthly monitoring to no less than quarterly monitoring if the system is in compliance with Division certified operator provisions and demonstrates that it meets the criteria in subsections 7.4.5.4.1.1 through 7.4.5.4.1.3. A system that loses its certified operator must return to monthly monitoring the month following that loss.

7.4.5.4.1.1 The system has a clean compliance history for a minimum of 12 months.

7.4.5.4.1.2 The most recent sanitary survey shows the system is free of sanitary defects (or has an approved plan and schedule to correct them and is in compliance with the plan and the schedule), has a protected water source and meets approved construction standards.

7.4.5.4.1.3 The system meets at least one of the following criteria:

7.4.5.4.1.3.1 An annual site visit by the Division that is equivalent to a Level 2 assessment or an annual Level 2 assessment by a party approved by the Division and correction of all identified sanitary defects (or an approved plan and schedule to correct them and is in compliance with the plan and schedule).

7.4.5.4.1.3.2 Cross connection control, as approved by the Division.

7.4.5.4.1.3.3 Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the Division.

7.4.5.4.1.3.4 Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under subsection 8.4.2.3.

7.4.5.4.3.1.5 Other equivalent enhancements to water system barriers as approved by the Division.

7.4.5.4.2 Reserved

7.4.5.5 Return to routine monthly monitoring requirements. Systems on quarterly monitoring that experience any of the events in subsections 7.4.5.5.1 through 7.4.5.5.4 must begin monthly monitoring the month following the event. The system must continue monthly monitoring until it meets the reduced monitoring requirements in subsection 7.4.5.4.

7.4.5.5.1 The system triggers a Level 2 assessment or two Level 1 assessments in a rolling 12-month period.

7.4.5.5.2 The system has an E. coli MCL violation.

7.4.5.5.3 The system has a coliform treatment technique violation.

7.4.5.5.4 The system has two subsection **[~~7.1~~ 7.4]** monitoring violations in a rolling 12-month period.

7.4.5.6 Additional routine monitoring the month following a total coliform positive sample. Systems collecting samples on a quarterly frequency must conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). Systems must collect at least three routine samples during the next month, except that the Division may waive this requirement if the conditions of subsection 7.4.5.6.1, 7.4.5.6.2, or 7.4.5.6.3 are met. Systems may either collect samples at regular time intervals throughout the month or may collect all required routine samples on a single day if samples are taken from different sites. Systems must use the results of additional routine samples in coliform treatment technique trigger calculations.

7.4.5.6.1 The Division may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the Division, or an agent approved by the Division, performs a site visit before the end of the next month in which the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Division to determine whether additional monitoring and/or any corrective action is needed. The Division cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the Division to perform sanitary surveys.

7.4.5.6.2 The Division may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the Division has determined why the sample was total coliform-positive and has established that the system has corrected the problem or will correct the problem before the end of the next month in which the system serves water to the public. In this case, the Division must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the Division official who recommends such a decision, and make this document available to the EPA and the public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem.

7.4.5.6.3 The Division may not waive the requirement to collect three additional routine samples the next month in which the system provides water to the public solely on the grounds that all repeat samples are total coliform negative. If the Division determines that the system has corrected the contamination problem before the system takes the set of repeat samples required in subsection 7.4.8, and all repeat samples were total coliform-negative, the Division may waive the requirement for additional routine monitoring the next month.

7.4.6 Routine monitoring requirements for surface water or ground water under the direct influence of surface water public water systems serving 1,000 or fewer people.

7.4.6.1 General.

7.4.6.1.1 The provisions of this section apply to surface water or ground water under the direct influence of surface water public water systems of this part serving 1,000 or fewer people.

7.4.6.1.2 Following any total coliform positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and E. coli analytical requirements in subsection 7.4.8.

7.4.6.1.3 Once all monitoring required by this section and subsection 7.4.8 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in 7.4.9 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by subsection 7.4.9.

7.4.6.1.4 Seasonal systems.

7.4.6.1.4.1 Beginning January 1, 2016, all seasonal systems must demonstrate completion of a Division approved start-up procedure, which may include a requirement for start-up sampling prior to serving water to the public.

7.4.6.1.4.2 The Division 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.

7.4.6.2 Routine monitoring frequency for total coliforms. Surface water or ground water under the direct influence of surface water systems of this part (including consecutive systems) must monitor monthly. Systems may not reduce monitoring.

7.4.6.3 Unfiltered subpart H systems. In accordance with subsection 17.1 a surface water or ground water under the direct influence of surface water system that does not practice filtration shall be prohibited.

7.4.7 Routine monitoring requirements for public water systems serving more than 1,000 people.

7.4.7.1 General.

7.4.7.1.1 The provisions of this section apply to public water systems serving more than 1,000 persons.

7.4.7.1.2 Following any total coliform positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and E. coli analytical requirements in subsection 7.4.8.

7.4.7.1.3 Once all monitoring required by this section and subsection 7.4.8 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in subsection 7.4.9 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by subsection 7.4.9.

7.4.7.1.4 Seasonal systems.

7.4.7.1.4.1 Beginning January 1, 2016, all seasonal systems must demonstrate completion of a Division approved start-up procedure, which may include a requirement for start-up sampling prior to serving water to the public.

7.4.7.1.4.2 The Division 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.

7.4.7.2 Monitoring frequency for total coliforms. The monitoring frequency for total coliforms is based on the population served by the system, as follows:

Total coliform monitoring frequency for public water systems serving more than 1,000 people

Population served	Minimum number of samples per month
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80

83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 90,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480

7.4.7.3 Unfiltered subpart H systems. In accordance with subsection 16.1 a surface water or ground water under the direct influence of surface water system that does not practice filtration shall be prohibited.

7.4.7.4 Reduced monitoring. Systems may not reduce monitoring, except for non-community water systems using only ground water (and not ground water under the direct influence of surface water) serving 1,000 or fewer people in some months and more than 1,000 persons in other months. In months when more than 1,000 persons are served, the systems must monitor at the frequency specified in subsection 7.4.7.2. In months when 1,000 or fewer people are served, the Division may reduce the monitoring frequency, in writing, to a frequency allowed under subsection 7.4.4 for a similarly situated system that always serves 1,000 or fewer people, taking into account the provisions in subsections 7.4.4.5 through 7.4.4.**[8]**.

7.4.8 Repeat monitoring and E. coli requirements.

7.4.8.1 Repeat monitoring.

7.4.8.1.1 If a sample taken under subsections 7.4.4 through 7.4.7 is total coliform-positive, the system must collect a set of repeat samples within 24 hours of being notified of the positive result. The system must collect no fewer than three repeat samples for each total coliform-positive sample found. The Division may extend the 24-hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. Alternatively, the Division may implement criteria for the system to use in lieu of case-by-case extensions. In the case of an extension, the Division must specify how much time the system has to collect the repeat samples. The Division cannot waive the requirement for a system to collect repeat samples in subsections 7.4.8.1.1 through 7.4.8.1.3.

7.4.8.1.2 The system must collect all repeat samples on the same day, except that the Division may allow a system with a single service connection to collect the required set of repeat samples over a three-day period or to collect a larger volume repeat sample(s) in one or more sample containers of any size, as long as the total volume collected is at least 300 ml.

7.4.8.1.3 The system must collect an additional set of repeat samples in the manner specified in subsections 7.4.8.1.1 through 7.4.8.1.3 if one or more repeat samples in the current set of repeat samples is total coliform positive. The system must collect the additional set of repeat samples within 24 hours of being notified of the positive result, unless the Division extends the limit as provided in subsection 7.4.8.1.1. The system must continue to collect additional sets of repeat samples until either total coliforms are not detected in one complete set of repeat samples or the system determines that a coliform treatment technique trigger specified in subsection 7.4.9.1 has been exceeded as a result of a repeat sample being total coliform-positive and notifies the Division. If a trigger identified in subsection 7.4.9 is exceeded as a result of a routine sample being total coliform positive, systems are required to conduct only one round of repeat monitoring for each total coliform positive routine sample.

7.4.8.1.4 After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five adjacent service connections of

the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.

7.4.8.1.5 Results of all routine and repeat samples taken under subsections 7.4.4 through 7.4.8 not invalidated by the Division must be used to determine whether a coliform treatment technique trigger specified in subsection 7.4.9 has been exceeded.

7.4.8.2 Escherichia coli (E. coli) testing.

7.4.8.2.1 If any routine or repeat sample is total coliform-positive, the system must analyze that total coliform-positive culture medium to determine if E. coli are present. If E. coli are present, the system must notify the Division by the end of the day when the system is notified of the test result, unless the system is notified of the result after the Division office is closed and the Division does not have either an after-hours phone line or an alternative notification procedure, in which case the system must notify the Division before the end of the next business day.

7.4.8.2.2 The Division has the discretion to allow a system, on a case-by-case basis, to forgo E. coli testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is E. coli-positive. Accordingly, the system must notify the Division as specified in subsection 7.4.8.2.1 of this section and the provisions of subsection 7.2**[.1.1.3]** apply.

7.4.9 Coliform treatment technique triggers and assessment requirements for protection against potential fecal contamination.

7.4.9.1 Treatment technique triggers. Systems must conduct assessments in accordance with subsection 7.4.9.2 after exceeding treatment technique triggers in subsections 7.4.9.1.1 and 7.4.9.1.2.

7.4.9.1.1 Level 1 treatment technique triggers.

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

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

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

7.4.9.1.2 Level 2 treatment technique triggers.

7.4.9.1.2.1 An E. coli MCL violation, as specified in subsection 7.4.10.1.

7.4.9.1.2.2 A second Level 1 trigger as defined in subsection 7.4.9.1.1, within a rolling 12-month period, unless the Division has determined a likely reason that the samples that caused the first Level 1 treatment technique trigger were total coliform positive and has established that the system has corrected the problem.

7.4.9.1.2.3 For systems with approved annual monitoring, a Level 1 trigger in two consecutive years.

7.4.9.2 Requirements for assessments.

7.4.9.2.1 Systems must ensure that Level 1 and 2 assessments are conducted in order to identify the possible presence of sanitary defects and defects in distribution system coliform monitoring practices. Level 2 assessments must be conducted by parties approved by the Division.

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

7.4.9.2.3 Level 1 Assessments. A system must conduct a Level 1 assessment consistent with Division requirements if the system exceeds one of the treatment technique triggers in subsection 7.4.9.1.1.

7.4.9.2.3.1 The system must complete a Level 1 assessment as soon as practical after any trigger in subsection 7.4.9.1.1. In the completed assessment form, the system must describe sanitary defects detected, corrective actions completed, and a proposed timetable for any corrective actions not already completed. The assessment form may also note that no sanitary defects

were identified. The system must submit the completed Level 1 assessment form to the Division within 30 days after the system learns that it has exceeded a trigger.

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

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

7.4.9.2.4 Level 2 Assessments. A system must ensure that a Level 2 assessment consistent with Division requirements is conducted if the system exceeds one of the treatment technique triggers in subsection 7.4.9.1.2. The system must comply with any expedited actions or additional actions required by the Division in the case of an E. coli MCL violation.

7.4.9.2.4.1 The system must ensure that a Level 2 assessment is completed by the Division or by a party approved by the Division as soon as practical after any trigger in subsection 7.4.9.1.2. The system must submit a completed Level 2 assessment form to the Division within 30 days after the system learns that it has exceeded a trigger. The assessment form must describe sanitary defects detected, corrective actions completed, and a proposed timetable for any corrective actions not already completed. The assessment form may also note that no sanitary defects were identified.

7.4.9.2.4.2 The system may conduct Level 2 assessments if the system has staff or management with the certification or qualifications specified by the Division unless otherwise directed by the Division.

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

7.4.9.2.4.4 Upon completion and submission of the assessment form by the system, the Division must determine if the system has identified a likely cause for the Level 2 trigger and determine whether the system has corrected the problem, or has included a schedule acceptable to the Division for correcting the problem.

7.4.9.3 Corrective Action. Systems must correct sanitary defects found through either Level 1 or 2 assessments conducted under subsection 7.4.9.2. For corrections not completed by the time of submission of the assessment form, the system must complete the corrective action(s) in compliance with a timetable approved by the Division in consultation with the system. The system must notify the Division when each scheduled corrective action is completed.

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

7.4.10 Violations.

7.4.10.1 E. coli MCL Violation. A system is in violation of the MCL for E. coli when any of the conditions identified in subsections 7.4.10.1.1 through 7.4.10.1.4 occur.

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

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

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

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

7.4.10.2 Treatment technique violation.

7.4.10.2.1 A treatment technique violation occurs when a system exceeds a treatment technique trigger specified in subsection 7.4.9.1 and then fails to conduct the required assessment or corrective actions within the timeframe specified in subsections 7.4.9.2 and 7.4.9.3.

7.4.10.2.2 A treatment technique violation occurs when a seasonal system fails to complete a Division-approved start-up procedure prior to serving water to the public.

7.4.10.3 Monitoring violations.

7.4.10.3.1 Failure to take every required routine or additional routine sample in a compliance period is a monitoring violation.

7.4.10.3.2 Failure to analyze for E. coli following a total coliform-positive routine sample is a monitoring violation.

7.4.10.4 Reporting violations.

7.4.10.4.1 Failure to submit a monitoring report or completed assessment form after a system properly conducts monitoring or assessment in a timely manner is a reporting violation.

7.4.10.4.2 Failure to notify the Division following an E. coli-positive sample as required by subsection 7.4.8.2.1 in a timely manner is a reporting violation.

7.4.10.4.3 Failure to submit certification of completion of Division-approved start-up procedure by a seasonal system is a reporting violation.

7.4.11 Reporting and recordkeeping.

7.4.11.1 Reporting.

7.4.11.1.1 E. coli.

7.4.11.1.1.1 A system must notify the Division by the end of the day when the system learns of an E. coli MCL violation, unless the system learns of the violation after the Division office is closed and the Division does not have either an after-hours phone line or an alternative notification procedure, in which case the system must notify the Division before the end of the next business day, and notify the public in accordance with Section 4.0.

7.4.11.1.1.2 A system must notify the Division by the end of the day when the system is notified of an E. coli-positive routine sample, unless the system is notified of the result after the Division office is closed and the Division does not have either an after-hours phone line or an alternative notification procedure, in which case the system must notify the Division before the end of the next business day.

7.4.11.1.2 A system that has violated the treatment technique for coliforms in subsection 7.4.9 must report the violation to the Division no later than the end of the next business day after it learns of the violation, and notify the public in accordance with Section 4.0.

7.4.11.1.3 A system required to conduct an assessment under the provisions of subsection 7.4.9 must submit the assessment report within 30 days. The system must notify the Division in accordance with subsection 7.4.9.3 when each scheduled corrective action is completed for corrections not completed by the time of submission of the assessment form.

7.4.11.1.4 A system that has failed to comply with a coliform monitoring requirement must report the monitoring violation to the Division within 10 days after the system discovers the violation, and notify the public in accordance with Section 4.0.

7.4.11.1.5 A seasonal system must certify, prior to serving water to the public, that it has complied with the Division-approved start-up procedure.

7.4.11.2 Recordkeeping.

7.4.11.2.1 The system must maintain any assessment form, regardless of who conducts the assessment, and documentation of corrective actions completed as a result of those assessments, or other available summary documentation of the sanitary defects and corrective actions taken under subsection 7.4.9 for Division review. This record must be maintained by the system for a period not less than five years after completion of the assessment or corrective action.

7.4.11.2.2 The system must maintain a record of any repeat sample taken that meets Division criteria for an extension of the 24-hour period for collecting repeat samples as provided for under subsection 7.4.8.1.1.

8.0 Ground Water Rule

8.1 General requirements and applicability

8.1.1 Scope of this section. The requirements of the ground water rule constitute National Primary Drinking Water Regulations.

8.1.2 Applicability. This section applies to all public water systems that use ground water except that it does not apply to public water systems that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment under subpart H. For the purposes of this section, “ground water system” is defined as any public water system meeting this applicability statement, including consecutive systems receiving finished ground water.

8.1.3 General requirements. Systems subject to this section must comply with the following requirements:

8.1.3.1 Sanitary survey information requirements for all ground water systems as described in subsection 8.2.

8.1.3.2 Microbial source water monitoring requirements for ground water systems that do not treat all of their ground water to at least 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer as described in subsection 8.3.

8.1.3.3 Treatment technique requirements, described in subsection 8.4, that apply to ground water systems that have fecally contaminated source waters, as determined by source water monitoring conducted under subsection 8.3, or that have significant deficiencies that are identified by the Division or that are identified by EPA under SDWA section 1445. A ground water system with fecally contaminated source water or with significant deficiencies subject to the treatment technique requirements of this section must implement one or more of the following corrective action options: correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer.

8.1.3.4 Ground water systems that provide at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer are required to conduct compliance monitoring to demonstrate treatment effectiveness, as described in subsection 8.4.2.

8.1.3.5 If requested by the Division, ground water systems must provide the Division with any existing information that will enable the State to perform a hydrogeologic sensitivity assessment. For the purposes of this section, “hydrogeologic sensitivity assessment” is a determination of whether ground water systems obtain water from hydrogeologically sensitive settings.

8.1.4 Compliance date. Ground water systems must comply, unless otherwise noted, with the requirements of this section beginning December 1, 2009.

8.2 Sanitary surveys for ground water systems.

8.2.1 Ground water systems must provide the Division, at the Division's request, any existing information that will enable the Division to conduct a sanitary survey.

8.2.2 For the purposes of this section, a “sanitary survey,” as conducted by the Division, includes but is not limited to, an onsite review of the water source(s) (identifying sources of contamination by using results of source water assessments or other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system to evaluate the adequacy of the system, its sources and operations and the distribution of safe drinking water.

8.2.3 The sanitary survey must include an evaluation of the applicable components listed in subsections 8.2.3.1 through 8.2.3.8:

8.2.3.1 Source,

8.2.3.2 Treatment,

8.2.3.3 Distribution system,

8.2.3.4 Finished water storage,

8.2.3.5 Pumps, pump facilities, and controls,

8.2.3.6 Monitoring, reporting, and data verification,

8.2.3.7 System management and operation, and

8.2.3.8 Operator compliance with Division requirements.

8.3 Ground water source microbial monitoring and analytical methods.

8.3.1 Triggered source water monitoring.

8.3.1.1 General requirements. A ground water system must conduct triggered source water monitoring if the conditions identified in subsections 8.3.1.1.1, 8.3.1.1.2 and 8.3.1.1.3 exist.

8.3.1.1.1 The system does not provide at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for each ground water source; and

8.3.1.1.2 The system is notified that a sample collected under subsection 7.1 is total coliform-positive and the sample is not invalidated under subsection 7.2.2 until December 31, 2015.

8.3.1.1.3 The system is notified that a sample collected under subsection 7.4.7 **[is]** total coliform-positive and the sample is not invalidated under subsection 7.4.3.3 beginning January 1, 2016.

8.3.1.2 Sampling Requirements. A ground water system must collect, within 24 hours of notification of the total coliform-positive sample, at least one ground water source sample from each ground water source in use at the time the total coliform-positive sample was collected under subsection 7.1 until December 31, 2015, or collected under subsections 7.4.4 through 7.4.7 beginning January 1, 2016 except as provided in subsection 8.3.1.2.2.

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

8.3.1.2.2 If approved by the Division, systems with more than one ground water source may meet the requirements of subsection 8.3.1.2 by sampling a representative ground water source or sources. If directed by the Division, systems must submit for Division approval a triggered source water monitoring plan that identifies one or more ground water sources that are representative of each monitoring site in the system's sample siting plan under subsection 7.1 until December 31, 2015, or under subsection 7.4.3 beginning January 1, 2016 and that the system intends to use for representative sampling under this paragraph.

8.3.1.2.3 Until December 31, 2015 a ground water system serving 1,000 people or fewer may use a repeat sample collected from a ground water source to meet both the requirements of subsection 7.2.3 and to satisfy the monitoring requirements of subsection 8.3.1.2 for that ground water source only if the Division approves the use of E. coli as a fecal indicator for source water monitoring under subsection 8.3.1. If the repeat sample collected from the ground water source is E. coli positive, the system must comply with subsection 8.3.1.3.

8.3.1.2.4 Beginning January 1, 2016 a ground water system serving 1,000 or fewer people may use a repeat sample collected from a ground water source to meet both the requirements of subsection 7.4 and to satisfy the monitoring requirements of subsection 8.3.1.2 for that ground water source only if the Division approves the use of *E. coli* as a fecal indicator for source water monitoring under subsection 8.3.1 and approves the use of a single sample for meeting both the triggered source water monitoring requirements in subsection 8.3.1 and the repeat monitoring requirements in subsection 7.4.8. If the repeat sample collected from the ground water source is E. coli-positive**[, the system must comply with subsection 8.3.1.3.]**

8.3.1.3 Additional Requirements. If the Division does not require corrective action under subsection 8.4.1.2 for a fecal indicator-positive source water sample collected under subsection 8.3.1.2 that is not invalidated under subsection 8.3.4, the system must collect five additional source water samples from the same source within 24 hours of being notified of the fecal indicator-positive sample.

8.3.1.4 Consecutive and Wholesale Systems.

8.3.1.4.1 In addition to the other requirements of subsection 8.3.1, a consecutive ground water system that has a total coliform-positive sample collected under subsection 7.1 until December 31, 2015 or under subsections 7.4.4 through 7.4.7 beginning January 1, 2016 must notify the wholesale system(s) within 24 hours of being notified of the total coliform-positive sample.

8.3.1.4.2 In addition to the other requirements of subsection 8.3.1, a wholesale ground water system must comply with subsections 8.3.1.4.2.1 and 8.3.1.4.2.2.

8.3.1.4.2.1 A wholesale ground water system that receives notice from a consecutive system it serves that a sample collected under subsection 7.11 until December 31, 2015 or under subsections 7.4.4 through 7.4.7 beginning January 1, 2016 is total coliform-positive must, within 24 hours of being notified, collect a sample from its ground water source(s) under subsection 8.3.1.2 and analyze it for a fecal indicator under subsection 8.3.3.

8.3.1.4.2.2 If the sample collected under subsection 8.3.1.4.2.1 is fecal indicator-positive, the wholesale ground water system must notify all consecutive systems served by that ground water source of the fecal indicator source water positive within 24 hours of being notified of the

ground water source sample monitoring result and must meet the requirements of subsection 8.3.1.3.

8.3.1.5 Exceptions to the Triggered Source Water Monitoring Requirements. A ground water system is not required to comply with the source water monitoring requirements of subsection 8.3.1 if either of the following conditions exists:

8.3.1.5.1 The Division determines, and documents in writing, that the total coliform-positive sample collected under subsection 7.1 1 until December 31, 2015 or under subsections 7.4.4 through 7.4.7 beginning January 1, 2016 is caused by a distribution system deficiency; or

8.3.1.5.2 The total coliform-positive sample collected under subsection 7.1 1 until December 31, 2015 or under subsections 7.4.4 through 7.4.7 beginning January 1, 2016 is collected at a location that meets Division criteria for distribution system conditions that will cause total coliform-positive samples.

8.3.2 Assessment Source Water Monitoring. If directed by the Division, ground water systems must conduct assessment source water monitoring that meets **[~~State~~ Division]**-determined requirements for such monitoring. A ground water system conducting assessment source water monitoring may use a triggered source water sample collected under subsection 8.3.1.2 to meet the requirements of subsection 8.3.2. Division-determined assessment source water monitoring requirements may include:

8.3.2.1 Collection of a total of 12 ground water source samples that represent each month the system provides ground water to the public,

8.3.2.2 Collection of samples from each well unless the system obtains written Division approval to conduct monitoring at one or more wells within the ground water system that are representative of multiple wells used by that system and that draw water from the same hydrogeologic setting,

8.3.2.3 Collection of a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used,

8.3.2.4 Analysis of all ground water source samples using one of the analytical methods listed **[~~in the~~]** in subsection 8.3.3.2 for the presence of E. coli, enterococci, or coliphage,

8.3.2.5 Collection of ground water source samples at a location prior to any treatment of the ground water source unless the Division approves a sampling location after treatment, and

8.3.2.6 Collection of ground water source samples at the well itself unless the system's configuration does not allow for sampling at the well itself and the Division approves an alternate sampling location that is representative of the water quality of that well.

8.3.3 Analytical methods.

8.3.3.1 A ground water system subject to the source water monitoring requirements of subsection 8.3.1 must collect a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used.

8.3.3.2 A ground water system must analyze all ground water source samples collected under subsection 8.3.1 using one of the analytical methods listed in the following table for the presence of E. coli, enterococci, or coliphage:

Analytical Methods for Source Water Monitoring

Fecal Indicator[1]	Methodology	Method Citation
E. coli	Colilert[3]……	9223 B.[2]
	Colisure[3]……	9223 B.[2]
	Membrane Filter Method with MI Agar……	EPA Method 1604[4]
	m-Coliblue24 Test[5]…….	
	E*Colite Test[6]……	
	EC-MUG[7]……	9221 F.[2]
	NA-MUG[7]……	9222 G.[2]
Enterococci	Multiple Tube Technique……	9230B.[2]
	Membrane Filter Technique……	9230C.[2]
	Membrane Filter Technique……	EPA Method 1600[8]
	Enterolert[9]……	

Coliphage	Two-Step Enrichment Presence-Absence Procedure…… Single Agar Layer Procedure……	EPA Method 1601.[10] EPA Method 1602.[11]

Analyses must be conducted in accordance with the documents listed below. The Director of the Federal Register approves the incorporation by reference of the documents listed in footnotes 2-11 in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the documents may be obtained from the sources listed below. Copies may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington DC 20460 (Telephone: 202-566-2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741- 6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

[1] The time from sample collection to initiation of analysis may not exceed 30 hours. The ground water system is encouraged but is not required to hold samples below 10^{o}C during transit.

[2] Methods are described in Standard Methods for the Examination of Water and Wastewater 20th edition (1998) and copies may be obtained from the American Public Health Association, 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 at http://www.epa.gov/nerlcwww/1604sp02.pdf or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

[5] A description of the m-ColiBlue24 Test, "Total Coliforms and E. coli Membrane Filtration Method with m-ColiBlue24[reg] Broth, "Method No. 10029 Revision 2, August 17, 1999, is available from Hach Company, 100 Dayton Ave., Ames, IA 50010 or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

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

[7] EC-MUG (Method 9221F) or NA-MUG (Method 9222G) can be used for E. coli testing step as described in Sec. 141.21(f)(6)(i) or (ii) after use of Standard Methods 9221 B, 9221 D, 9222 B, or 9222 C.

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

[9] 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.

[10] EPA Method 1601: Male-specific (F+) and Somatic Coliphage in Water by Two-step Enrichment Procedure; April 2001, EPA 821-R-01-030. Method is available at http://www.epa.gov/nerlcwww/1601ap01.pdf or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

[11] EPA Method 1602: Male-specific (F+) and Somatic Coliphage in Water by Single Agar Layer (SAL) Procedure; April 2001, EPA 821-R-01-029. Method is available at http://www.epa.gov/nerlcwww/1602ap01.pdf or from EPA's Water Resource Center (RC-4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

8.3.4 Invalidation of a fecal indicator-positive ground water source sample.

8.3.4.1 A ground water system may obtain Division invalidation of a fecal indicator-positive ground water source sample collected under subsection 8.3.1 only under the conditions specified in subsection**[s]** 8.3.4.1.1 and 8.3.4.1.2.

8.3.4.1.1 The system provides the Division with written notice from the laboratory that improper sample analysis occurred; or

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

8.3.4.2 If the Division invalidates a fecal indicator-positive ground water source sample, the ground water system must collect another source water sample under subsection 8.3.1 within 24 hours of being notified by the Division of its invalidation decision and have it analyzed for the same fecal indicator using the analytical methods in subsection 8.3.3. The Division may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the Division must specify how much time the system has to collect the sample.

8.3.5 Sampling location.

8.3.5.1 Any ground water source sample required under subsection 8.3.1 must be collected at a location prior to any treatment of the ground water source unless the Division approves a sampling location after treatment.

8.3.5.2 If the system's configuration does not allow for sampling at the well itself, the system may collect a sample at a Division-approved location to meet the requirements of subsection 8.3.1 if the sample is representative of the water quality of that well.

8.3.6 New Sources. If directed by the Division, a ground water system that places a new ground water source into service after November 30, 2009, must conduct assessment source water monitoring under subsection 8.3.2. If directed by the Division, the system must begin monitoring before the ground water source is used to provide water to the public.

8.3.7 Public Notification. A ground water system with a ground water source sample collected under subsections 8.3.1 or 8.3.2 that is fecal indicator-positive and that is not invalidated under subsection 8.3.4, including consecutive systems served by the ground water source, must conduct public notification under subsection 4.2.1.1.1.

8.3.8 Monitoring Violations. Failure to meet the requirements of subsections 8.3.1 through 8.3.6 is a monitoring violation and requires the ground water system to provide public notification under subsection 4.2.1.1.3.

8.4 Treatment technique requirements for ground water systems.

8.4.1 Ground water systems with significant deficiencies or source water fecal contamination.

8.4.1.1 The treatment technique requirements of this section must be met by ground water systems when a significant deficiency is identified or when a ground water source sample collected under subsection 8.3.1.3 is fecal indicator-positive.

8.4.1.2 If directed by the Division, a ground water system with a ground water source sample collected under subsection 8.3.1.2, subsection 8.3.1.4, or subsection 8.3.2 that is fecal indicator-positive must comply with the treatment technique requirements of this subsection.

8.4.1.3 When a significant deficiency is identified at a Subpart H public water system that uses both ground water and surface water or ground water under the direct influence of surface water, the system must comply with provisions of subsection 8.4 except in cases where the Division determines that the significant deficiency is in a portion of the distribution system that is served solely by surface water or ground water under the direct influence of surface water.

8.4.1.4 Unless the Division directs the ground water system to implement a specific corrective action, the ground water system must consult with the Division regarding the appropriate corrective action within 30 days of receiving written notice from the Division of a significant deficiency, written notice from a laboratory that a ground water source sample collected under subsection 8.3.1.3 was found to be fecal indicator-positive, or direction from the Division that a fecal indicator-positive collected under subsection 8.3.1.2, subsection 8.3.1.4, or subsection 8.3.2 requires corrective action. For the purposes of this section, significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the Division determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

8.4.1.5 Within 120 days (or earlier if directed by the Division) of receiving written notification from the Division of a significant deficiency, written notice from a laboratory that a ground water source sample collected under subsection 8.3.1.3 was found to be fecal indicator-positive, or direction from the Division that a fecal indicator-positive sample collected under subsection 8.3.1.2, subsection 8.3.1.4, or subsection 8.3.2 requires corrective action, the ground water system must either:

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

8.4.1.5.2 Be in compliance with a Division-approved corrective action plan and schedule subject to the conditions specified in subsections 8.4.1.5.2.1 and 8.4.1.5.2.2.

8.4.1.5.2.1 Any subsequent modifications to a Division-approved corrective action plan and schedule must also be approved by the Division.

8.4.1.5.2.2 If the Division specifies interim measures for protection of the public health pending Division approval of the corrective action plan and schedule or pending completion of the corrective action plan, the system must comply with these interim measures as well as with any schedule specified by the Division.

8.4.1.6 Corrective Action Alternatives. Ground water systems that meet the conditions of subsections 8.4.1.1 or 8.4.1.2 must implement one or more of the following corrective action alternatives:

8.4.1.6.1 Correct all significant deficiencies;

8.4.1.6.2 Provide an alternate source of water;

8.4.1.6.3 Eliminate the source of contamination; or

8.4.1.6.4 Provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

8.4.1.7 Special notice to the public of significant deficiencies or source water fecal contamination.

8.4.1.7.1 In addition to the applicable public notification requirements of subsection 4.2.1.1.1, a community ground water system that receives notice from the Division of a significant deficiency or notification of a fecal indicator-positive ground water source sample that is not invalidated by the Division under subsection 8.3.4 must inform the public served by the water system under subsection 4.3.3.8.6 of the fecal indicator-positive source sample or of any significant deficiency that has not been corrected. The system must continue to inform the public annually until the significant deficiency is corrected or the fecal contamination in the ground water source is determined by the Division to be corrected under subsection 8.4.1.5.

8.4.1.7.2 In addition to the applicable public notification requirements of subsection 4.2.1.1.1, a non-community ground water system that receives notice from the Division of a significant deficiency must inform the public served by the water system in a manner approved by the Division of any significant deficiency that has not been corrected within 12 months of being notified by the Division, or earlier if directed by the Division. The system must continue to inform the public annually until the significant deficiency is corrected. The information must include:

8.4.1.7.2.1 The nature of the significant deficiency and the date the significant deficiency was identified by the Division;

8.4.1.7.2.2 The Division-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed; and

8.4.1.7.2.3 For systems with a large proportion of non-English speaking consumers, as determined by the Division, information in the appropriate language(s) regarding the importance of the notice or a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.

8.4.1.7.3 If directed by the Division, a non-community water system with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how the deficiencies were corrected, and the dates of correction under subsection 8.4.1.7.2.

8.4.2 Compliance monitoring

8.4.2.1 Existing ground water sources. A ground water system that is not required to meet the source water monitoring requirements of this subsection for any ground water source because it provides at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for any ground water source before December 1, 2009, must notify the Division in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the specified ground water source and begin compliance monitoring in accordance with subsection 8.4.2.3 by December 1, 2009. Notification to the Division must include engineering, operational, or other information that the Division requests to evaluate the submission. If the system subsequently discontinues 4-log

treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source, the system must conduct ground water source monitoring as required under subsection 8.3.

8.4.2.2 New ground water sources. A ground water system that places a ground water source in service after November 30, 2009, that is not required to meet the source water monitoring requirements of this subsection because the system provides at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source must comply with the requirements of subsections 8.4.2.2.1, 8.4.2.2.2 and 8.4.2.2.3.

8.4.2.2.1 The system must notify the Division in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source. Notification to the Division must include engineering, operational, or other information that the division requests to evaluate the submission.

8.4.2.2.2 The system must conduct compliance monitoring as required under subsection 8.4.2.3 within 30 days of placing the source in service.

8.4.2.2.3 The system must conduct ground water source monitoring under subsection 8.3 if the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

8.4.2.3 Monitoring requirements. A ground water system subject to the requirements of subsections 8.4.2.1, 8.4.2.2.1 or 8.4.2.2.2 must monitor the effectiveness and reliability of treatment for that ground water source before or at the first customer as follows:

8.4.2.3.1 Chemical disinfection

8.4.2.3.1.1 Ground water systems serving greater than 3,300 people. A ground water system that serves greater than 3,300 people must continuously monitor the residual disinfectant concentration using analytical methods specified in subsection **[~~8.2.1~~ 1.19.2]** at a location approved by the Division and must record the lowest residual disinfectant concentration each day that water from the ground water source is served to the public. The ground water system must maintain the Division-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. If there is a failure in the continuous monitoring equipment, the ground water system must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service. The system must resume continuous residual disinfectant monitoring within 14 days.

8.4.2.3.1.2 Ground water systems serving 3,300 or fewer people. A ground water system that serves 3,300 or fewer people must monitor the residual disinfectant concentration using analytical methods specified in subsection **[~~8.2.1~~ 1.19.2]** at a location approved by the Division and record the residual disinfection concentration each day that water from the ground water source is served to the public. The ground water system must maintain the Division-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. The ground water system must take a daily grab sample during the hour of peak flow or at another time specified by the Division. If any daily grab sample measurement falls below the Division-determined residual disinfectant concentration, the ground water system must take follow-up samples every four hours until the residual disinfectant concentration is restored to the Division-determined level. Alternatively, a ground water system that serves 3,300 or fewer people may monitor continuously and meet the requirements of subsection 8.4.2.3.1.1.

8.4.2.3.2 Membrane filtration. A ground water system that uses membrane filtration to meet the requirements of this section must monitor the membrane filtration process in accordance with all Division-specified monitoring requirements and must operate the membrane filtration in accordance with all Division-specified compliance requirements. A ground water system that uses membrane filtration is in compliance with the requirement to achieve at least 4-log removal of viruses when:

8.4.2.3.2.1 The membrane has an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses;

8.4.2.3.2.2 The membrane process is operated in accordance with Division-specified compliance requirements; and

8.4.2.3.2.3 The integrity of the membrane is intact.

8.4.2.3.3 Alternative treatment. A ground water system that uses a Division-approved alternative treatment to meet the requirements of this section by providing at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer must:

8.4.2.3.3.1 Monitor the alternative treatment in accordance with all Division-specified monitoring requirements; and

8.4.2.3.3.2 Operate the alternative treatment in accordance with all compliance requirements that the Division determines to be necessary to achieve at least 4-log treatment of viruses.

8.4.3 Discontinuing treatment. A ground water system may discontinue 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source if the Division determines and documents in writing that 4-log treatment of viruses is no longer necessary for that ground water source. A system that discontinues 4-log treatment of viruses is subject to the source water monitoring and analytical methods requirements of subsection 8.3.

8.4.4 Failure to meet the monitoring requirements of subsection 8.4.2.1 is a monitoring violation and requires the ground water system to provide public notification under subsection 4.2.1.1.3.

8.5 Treatment technique violations for ground water systems.

8.5.1 A ground water system with a significant deficiency is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the Division) of receiving written notice from the Division of the significant deficiency, the system:

8.5.1.1 Does not complete corrective action in accordance with any applicable Division plan review processes or other Division guidance and direction, including Division specified interim actions and measures, or

8.5.1.2 Is not in compliance with a Division-approved corrective action plan and schedule.

8.5.2 Unless the Division invalidates a fecal indicator-positive ground water source sample under subsection 8.3.4, a ground water system is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the Division) of meeting the conditions of subsection 8.4.1.1 or subsection 8.4.1.2, the system:

8.5.2.1 Does not complete corrective action in accordance with any applicable Division plan review processes or other Division guidance and direction, including Division-specified interim measures, or

8.5.2.2 Is not in compliance with a Division-approved corrective action plan and schedule.

8.5.3 A ground water system subject to the requirements of subsection 8.4.2.3 that fails to maintain at least 4-log treatment of viruses (using inactivation, removal, or a Division-approved combination of 4-log virus inactivation and removal) before or at the first customer for a ground water source is in violation of the treatment technique requirement if the failure is not corrected within four hours of determining the system is not maintaining at least 4-log treatment of viruses before or at the first customer.

8.5.4 Ground water system must give public notification under subsection 4.2.1.1.2 for the treatment technique violations specified in subsections 8.5.1, 8.5.2 and 8.5.3.

8.6 Reporting and recordkeeping for ground water systems.

8.6.1 Reporting. In addition to the requirements of subsection 4.1, a ground water system regulated under this section must provide the following information to the Division:

8.6.1.1 A ground water system conducting compliance monitoring under subsection 8.4.2 must notify the Division any time the system fails to meet any Division-specified requirements including, but not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within four hours. The ground water system must notify the Division as soon as possible, but in no case later than the end of the next business day.

8.6.1.2 After completing any corrective action under subsection 8.4.1, a ground water system must notify the Division within 30 days of completion of the corrective action.

8.6.1.3 If a ground water system subject to the requirements of subsection 8.3.1 does not conduct source water monitoring under subsection 8.3.1.5.3, the system must provide documentation to the Division within 30 days of the total coliform positive sample that it met the Division criteria.

8.6.2 Recordkeeping. In addition to the requirements of Section 5.0, a ground water system regulated under this section must maintain the following information in its records:

8.6.2.1 Documentation of corrective actions. Documentation shall be kept for a period of not less than ten years.

8.6.2.2 Documentation of notice to the public as required under subsection 8.4.1.7. Documentation shall be kept for a period of not less than three years.

8.6.2.3 Records of decisions under subsection 8.3.1.5.2 and records of invalidation of fecal indicator-positive ground water source samples under subsection 8.3.4. Documentation shall be kept for a period of not less than five years.

8.6.2.4 For consecutive systems, documentation of notification to the wholesale system(s) of total-coliform positive samples that are not invalidated under subsection 7.2.2 until December 31, 2015, or under subsection 7.4.3. Documentation shall be kept for a period of not less than five years.

8.6.2.5 For systems, including wholesale systems, that are required to perform compliance monitoring under subsection 8.4.2:

8.6.2.5.1 Records of the Division-specified minimum disinfectant residual. Documentation shall be kept for a period of not less than ten years.

8.6.2.5.2 Records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the Division-prescribed minimum residual disinfectant concentration for a period of more than four hours. Documentation shall be kept for a period of not less than five years.

8.6.2.5.3 Records of Division-specified compliance requirements for membrane filtration and of parameters specified by the Division for Division-approved alternative treatment and records of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four hours. Documentation shall be kept for a period of not less than five years.

9.0 Inorganic and Organic Chemical Requirements

9.1 Inorganic Chemical Requirements

9.1.1 PMCLs AND SMCLs: The following are the inorganic PMCLs and SMCLs (mg/L - milligrams per liter). Compliance is determined pursuant to subsection 9.1.2 through 9.1.13.

9.1.1.1 Table of PMCLs

PMCLs Substance	MCL
Antimony (Sb)	0.006 mg/L
Arsenic (As)	0.010 mg/L
Asbestos	7 MF/L*
Barium (Ba)	2 mg/L
Beryllium (Be)	0.004 mg/L
Cadmium (Cd)	0.005 mg/L
Chromium (Cr)	0.1 mg/L
Cyanide (Cn)	0.2 mg/L
Fluoride (F)	2.0 mg/L (See subsections 9.1.8 and 9.1.14)
Mercury (Hg)	0.002 mg/L
Nickel (Ni)	0.1 mg/L
Nitrate-Nitrogen (NO3-N)	10 mg/L (See subsections 9.1.6 and 9.1.8)
Nitrite-Nitrogen (NO2-N)	1 mg/L (See subsections 9.1.7 and 9.1.8)
Total Nitrate-Nitrogen and Nitrite-Nitrogen (NO3-N + NO2-N)	10 mg/L
Selenium (Se)	0.05 mg/L
Thallium (Tl)	0.002 mg/L
Turbidity	See subsection 7.1

*MFL - million fibers per liter, with fiber length > 10 microns

9.1.1.2 Table of SMCLs

SMCLs Substance	MCL
Aluminum	0.05–0.2 mg/L
Chloride (Cl)	250 mg/L
Color	15 color units
Corrosivity	Noncorrosive (See Section 11.0)
Foaming agents	0.50 mg/L
Iron (Fe)	0.30 mg/L
Manganese (Mn)	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.1 mg/L
Sulfate (SO4)	250 mg/L
Total Dissolved Solids (TDS)	500 mg/L
Zinc (Zn)	5 mg/L

9.1.1.3 Table for Lead/Copper MCLGs: The Maximum Contaminant Level Goals (MCLG) for lead and copper are as follows:

Lead	0 mg/L
Copper	1.3 mg/L

9.1.2 Sampling and Analytical Requirements:

9.1.2.1 Community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in subsection 9.1.1 in accordance with subsections 9.1.3 through 9.1.13. Non-transient, non-community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in subsection 9.1.1 in accordance with subsections 9.1.3 through 9.1.13. Transient, non-community water systems shall conduct monitoring to determine compliance with the nitrate and nitrite maximum contaminant levels in subsection 9.1.1 in accordance with subsections 9.1.3 through 9.1.13.

9.1.2.2 Detection limits for each analytical method shall be in accordance with 40 CFR 141.23(a)(4)(i) as amended. Copies may be obtained from the Office of Drinking Water.

9.1.3 Monitoring shall be conducted as follows:

9.1.3.1 Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment [hereafter called a sampling point] beginning in the compliance period starting January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

9.1.3.1.1 Groundwater systems with 150 or more service connections shall begin monitoring for Phase II and Phase V contaminants on January 1, 1993.

9.1.3.1.2 Groundwater systems with less than 150 service connections shall begin monitoring for Phase II contaminants on January 1, 1993 and for Phase V contaminants on January 1, 1996.

9.1.3.2 Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment [hereafter called a sampling point] beginning in the compliance period beginning January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

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

9.1.3.2.1 Surface water systems with 150 or more service connections shall begin monitoring for Phase II and Phase V contaminants on January 1, 1993.

9.1.3.2.2 Surface water systems with less than 150 service connections shall begin monitoring for Phase II contaminants on January 1, 1993 and for Phase V contaminants on January 1, 1996.

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

9.1.3.4 The Division may reduce the total number of samples which must be analyzed by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory.

9.1.3.4.1 If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic chemical, then a follow-up sample must be taken within 14 days at each sampling point included in the composite. These samples must be analyzed for the contaminants which exceeded one-fifth of the MCL in the composite sample.

9.1.3.4.2 If the population served by the system is >3,300 persons, then compositing may only be permitted by the Division at sampling points within a single system. In systems serving <3,300 persons, the Division may permit compositing among different systems provided the 5-sample limit is maintained.

9.1.3.4.3 If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the Division within 14 days of collection

9.1.3.5 The frequency of monitoring for asbestos shall be in accordance with subsection 9.1.4; the frequency of monitoring for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be in accordance with subsection 9.1.5; the frequency of monitoring for nitrate shall be in accordance with subsection 9.1.6; and the frequency of monitoring for nitrite shall be in accordance with subsection 9.1.7.

9.1.4 The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in subsection 9.1.1 shall be conducted as follows:

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

9.1.4.2 If the system believes it is not vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos-cement pipe, or both, it may apply to the Division for a waiver of the monitoring requirement in subsection 9.1.4.1. If the Division grants the waiver, the system is not required to monitor.

9.1.4.3 The Division may grant a waiver based on a consideration of the following factors:

9.1.4.3.1 Potential asbestos contamination of the water source, and

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

9.1.4.4 A waiver remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver must monitor in accordance with the provisions of subsection 9.1.4.1.

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

9.1.4.6 A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of subsection 9.1.3.

9.1.4.7 A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe shall take one sample at each entry point after treatment and a minimum of one tap sample served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

9.1.4.8 A system which exceeds PMCL listed in subsection 9.1.1 shall monitor quarterly beginning in the next quarter after the violation occurred.

9.1.4.9 The Division may decrease the quarterly monitoring requirement to the frequency specified in subsection 9.1.4.1 provided the Division has determined that the system is reliably and consistently below the maximum contaminant level. In no case can a Division make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface (or combined surface/ground) water system takes a minimum of four quarterly samples.

9.1.4.10 If monitoring data collected after January 1, 1990 are generally consistent with the requirements of this section then the Division may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

9.1.5 The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in subsection 9.1.1 for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be as follows:

9.1.5.1 Groundwater systems shall take one sample at each sampling point once every three (3) years. Surface Water systems [or combined surface/ground] shall take one sample annually at each sampling point beginning January 1, 1993.

9.1.5.2 The system may apply to the Division for a waiver from the monitoring frequencies specified in subsection 9.1.5.1.

9.1.5.3 A condition of the waiver shall require that a system shall take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one compliance cycle (i.e., nine years).

9.1.5.4 The Division may grant a waiver provided surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (At least one sample shall have been taken since January 1, 1990.) Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.

9.1.5.5 In determining the appropriate reduced monitoring frequency, the Division shall consider:

9.1.5.5.1 Reported concentrations from all previous monitoring.

9.1.5.5.2 The degree of variation in reported concentrations; and

9.1.5.5.3 Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the systems configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.

9.1.5.6 A decision by the Division to grant a waiver shall be made in writing and shall set forth the basis for the determination. The determination may be initiated by the Division or upon an application by the public water system. The public water system shall specify the basis for its request. The Division shall review and, where appropriate, revise its determination of the appropriate monitoring frequency when the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency become available.

9.1.5.7 Systems which exceed the MCLs as calculated in subsection 9.1.11 shall monitor quarterly beginning in the next quarter after the violation occurred.

9.1.5.8 The Division may decrease the quarterly monitoring requirement to the frequencies specified in subsections 9.1.5.1 and 9.1.5.2 provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Division make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

9.1.5.9 All new systems that use a new source of water or existing systems that add 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 Division. The system must also comply with the initial sampling frequencies specified by the Division to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

9.1.6 All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate in subsection 9.1.1.

9.1.6.1 Community and non-transient, non-community water systems served by groundwater systems shall monitor annually and systems served by surface water shall monitor quarterly.

9.1.6.2 For community and non-transient, non-community water systems, the repeat monitoring frequency for groundwater systems shall be quarterly for at least one year following any one sample in which

the concentration is ≥50 percent of the MCL. The Division may allow a groundwater system to reduce the sampling frequency to annually after four consecutive quarterly samples are reliably and consistently less than 85 percent of the MCL.

9.1.6.3 For community and non-transient, non-community water systems, the Division may allow a surface water system to reduce the sampling frequency to annually if all analytical results from four consecutive quarters are <50 percent of the MCL. A surface water system shall return to quarterly monitoring if any one sample is ≥50 percent of the MCL.

9.1.6.4 Each transient non-community water system shall monitor annually beginning January 1, 1993.

9.1.6.5 After the initial round of quarterly sampling is completed, each community and non-transient non-community system which is monitoring annually shall take subsequent samples during the quarter(s) which previously resulted in the highest analytical result.

9.1.7 All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrite in subsection 9.1.1

9.1.7.1 All public water systems shall take one sample at each sampling point in the distribution system during the compliance period beginning January 1, 1993 and ending December 31, 1995.

9.1.7.2 After the initial sample, systems where an analytical result for nitrite is <50 percent of the MCL shall monitor at the frequency specified by the Division.

9.1.7.3 For community, non-transient, non-community, and transient non-community water systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is ≥50 percent of the MCL. The Division may allow a system to reduce the sampling frequency to annually after determining the system is reliably and consistently less than the MCL.

9.1.7.4 Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.

9.1.8 Confirmation Samples:

9.1.8.1 Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, or thallium indicate an exceedance of the maximum contaminant level, the Division may require that one additional sample be collected, as soon as possible after the initial sample was taken (but not to exceed two weeks), at the same sampling point.

9.1.8.2 Where nitrate or nitrite sampling results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample. Systems unable to comply with the 24-hour sampling requirement must immediately notify the consumers in the area served by the public water system in accordance with subsection 4.2. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

9.1.8.3 If a Division-required confirmation sample is taken for any contaminant, then the results of the initial and confirmation sample shall be averaged. The resulting average shall be used to determine the system's compliance in accordance with subsection 9.1.11. The Division has the discretion to delete results of obvious sampling errors. Sampling errors include, but are not limited to samples collected from the wrong system or samples collected from private wells located within a public water system.

9.1.9 The Division may require more frequent monitoring than specified in subsections 9.1.4, 9.1.5, 9.1.6 and 9.1.7 or may require confirmation samples for positive and negative results at its discretion.

9.1.10 Systems may apply to the Division to conduct more frequent monitoring than the minimum monitoring frequencies specified in this section.

9.1.11 Compliance with subsection 9.1.1 shall be determined based on the analytical result(s) obtained at each sampling point:

9.1.11.1 For systems which are conducting monitoring at a frequency greater than annual, compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, and thallium is determined by a running annual average at each sampling point. If the average at any sampling point is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample below the detection limit shall be calculated at zero for the purpose of determining the annual average. If a system fails

to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.

9.1.11.2 For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, and thallium if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Division, the determination of compliance will be based on the annual average of the initial MCL exceedance and any Division-required confirmation samples. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.

9.1.11.3 Compliance with the maximum contaminant levels for nitrate and nitrite is determined based on one sample if the levels of these contaminants are below the MCLs. If the levels of nitrate and/or nitrite exceed the MCLs in the initial sample, a confirmation sample is required and compliance shall be determined based on the average of the initial and confirmation samples.

9.1.11.4 If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Division may allow the system to give public notice to only the area served by that portion of the system which is out of compliance.

9.1.11.5 Arsenic sampling results will be reported to the nearest 0.001 mg/L.

9.1.12 Each public water system shall monitor at the time designated by the Division during each compliance period.

9.1.13 At the discretion of the Division, nitrate levels not to exceed 20 mg/L may be allowed in TNCWS and NTNCWS if the supplier of water demonstrates to the satisfaction of the Division that:

9.1.13.1 Such water will not be available to children under one (1) year of age;

9.1.13.2 There will be continuous posting of the fact that nitrate levels exceed ten (10) mg/L and the potential health effects of exposure and;

9.1.13.3 No adverse health effects shall result.

9.1.14 Fluoride (F):

9.1.14.1 Where fluoridation has been or will be instituted as provided by Delaware Law and the fluoride content of a water supply is less than 0.8 mg/L, fluoride should be adjusted to provide a concentration within a range of 0.8-1.2 mg/L and shall not exceed 2.0 mg/L. Defluoridation of water shall be provided when the natural fluoride concentration exceeds 2.0 mg/L. In addition to the sampling and analysis required by subsection 9.1.5, fluoridated and defluoridated water supplies shall be sampled and analyzed daily by the supplier of water at a representative point(s) in the water supply system. In the event that the fluoride level exceeds 2.0 mg/L, samples shall be taken every two hours until the level returns to 2.0 mg/L or less. The exceedance shall be treated as a Tier 2 violation requiring public notification. If the fluoride level exceeds 4.0 mg/L a Tier 1 public notice is required. The fluoride levels shall be reported to the Division pursuant to subsection 4.1.1.

9.1.14.2 All municipal water supplies, whether municipally owned or privately owned, shall comply with subsection 9.1.14.1. All affected water supplies shall submit cost estimates to the Department of Health and Social Services no later than November 15, 1998.

9.1.15 Sodium (Na):

9.1.15.1 The supplier of water for a CWS shall collect and analyze one (1) sample per plant at the entry point of the distribution system for the determination of sodium concentration levels; samples must be collected and analyzed annually for systems utilizing surface water sources in whole or in part and at least every three (3) years for systems utilizing solely ground water sources. The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with Division approval be considered one (1) treatment plant for determining the minimum number of samples. The supplier of water may be required by the Division to collect and analyze water samples for sodium more frequently in locations where the sodium content is variable.

9.1.15.2 The supplier of water shall report to the Division the results of analyses for sodium pursuant to subsection 4.1.1.

9.1.15.3 The supplier of water shall notify appropriate local and State public health officials of the sodium levels by written notice by direct mail within three (3) months. A copy of each notice required to be provided by this paragraph shall be sent to the Division within ten (10) days of issuance. The

supplier of water is not required to notify appropriate local public health officials of the sodium levels where the Division provides such notices in lieu of the supplier.

9.1.15.4 Analysis for sodium shall be performed in accordance with 40 CFR 141.23(k)(1) as amended. Copies may be obtained from the Office of Drinking Water.

9.1.16 Inorganic Compliance Determination:

9.1.16.1 Analysis for the purpose of determining compliance with subsection 9.1.1 shall be in accordance with the following:

9.1.16.1.1 PMCL analyses for all CWSs utilizing surface water sources shall be conducted annually. SMCL analyses shall be performed at the discretion of the Division.

9.1.16.1.2 PMCL analyses for all CWSs utilizing only ground water sources shall be conducted at three (3) year intervals. SMCL analyses shall be performed at the discretion of the Division.

9.1.16.1.3 For TNCWSs and NTNCWSs, whether supplied by surface or ground water sources, analyses for the purpose of determining compliance for nitrate shall be conducted at intervals determined by the Division.

9.1.16.1.4 The Division has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by its sanctioned representatives and agencies.

9.1.16.2 The provision of subsections 9.1.6 and 9.1.7 notwithstanding compliance with the PMCL for nitrate shall be determined on the basis of the mean of two (2) analyses. When a level exceeding the PMCL for nitrate is found, a second analysis shall be initiated within twenty-four (24) hours, and if the mean of the two (2) analyses exceeds the PMCL, the supplier of water shall report his findings to the Division pursuant to subsection 4.1 and shall notify the public pursuant to subsection 4.2.

9.1.16.3 For the initial analyses required by subsections 9.1.16.1, 9.1.16.2 and 9.1.16.3, data for surface waters acquired within one (1) year prior to the effective date and data for ground waters acquired within three (3) years prior to the effective date of this section may be substituted at the discretion of the Division.

9.1.17 Analytical Methodology:

9.1.17.1 Analyses conducted to determine compliance with subsection 9.1.1 for inorganic chemicals shall be made in accordance with the following methods.

9.1.17.1.1 PMCLs shall be in accordance with 40 CFR 141.23(k)(1) as amended. Copies may be obtained from the Office of Drinking Water.

9.1.17.1.2 SMCLs shall be accordance with 40 CFR section 143.4 as amended. Copies may be obtained from the Office of Drinking Water.

9.1.17.1.3 Sample Collection and Preservation: - Sample collection for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium and thallium under this section shall be conducted using the sample preservation method(s), container, and maximum holding time procedures in accordance with 40 CFR 141.23(k)(2) as amended. Copies may be obtained from the Office of Drinking Water.

9.1.17.1.4 Lab Approval: Analysis under this section shall only be conducted by laboratories that have received approval by EPA, other approved certifying organization, or the State of Delaware. To receive approval to conduct analyses for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium and thallium the laboratory must:

9.1.17.1.4.1 Analyze Performance Evaluation samples annually in accordance with subsection 1.14.

9.1.17.1.4.2 Achieve quantitative results on the analyses that are in accordance with 40 CFR 141.23(k)(3)(ii) as amended. Copies may be obtained from the Office of Drinking Water.

9.2 Organic Chemical Requirements:

9.2.1 PMCLs: The following are the organic PMCLs (mg/L-milligrams per liter). Compliance is determined pursuant to subsections 9.2.2, 9.2.3, and 9.2.4.

9.2.1.1 The following maximum contaminant levels for synthetic organic contaminants apply to community water systems and non-transient, non-community water systems:

Pesticides and PCBs

Contaminant	MCL

Alachlor	0.002 mg/L
Atrazine	0.003 mg/L
Benzo(a)pyrene	0.0002 m g/L
Carbofuran	0.04 mg/L
Chlordane	0.002 mg/L
Dalapon	0.2 mg/L
Di(2-ethylhexyl) adipate	0.4 mg/L
Di(2-ethylhexyl) phthalate	0.006 mg/L
Dibromochloropropane	0.0002 mg/L
Dinoseb	0.007 mg/L
Diquat	0.02 mg/L
2,4-D	0.07 mg/L
Endothall	0.1 mg/L
Endrin	0.002 mg/L
Ethylenedibromide (EDB)	0.00005 mg/L
Glyphosate	0.7 mg/L
Heptachlor	0.0004 mg/L
Heptachlor epoxide	0.0002 mg/L
Hexachlorobenzene	0.001 mg/L
Hexachlorocyclopentadiene	0.05 mg/L
Lindane	0.0002 mg/L
Methoxychlor	0.04 mg/L
Oxamyl (Vydate)	0.2 mg/L
Pentachlorophenol	0.001 mg/L
Picloram	0.5 mg/L
Polychlorinated biphenyls (PCBs)	0.0005 mg/L
Simazine	0.004 mg/L
2,3,7,8-TCDD (Dioxin)	3 X 10-8 mg/L
Toxaphene	0.003 mg/L
2,4,5-TP (Silvex)	0.05 mg/L

9.2.1.2 Disinfection Byproducts (DBPs)

Contaminant	MCL
Total Trihalomethanes (TTHMs)	0.080 mg/L
Haloacetic acids (five) (HAA5)	0.060 mg/L
Bromate	0.010 mg/L
Chlorite	1.0 mg/L

9.2.1.2.1 Maximum Contaminant Level Goals for disinfection byproducts.

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

9.2.1.3 Volatile Synthetic Organic Chemicals (VOCs)

Contaminant	MCL
Benzene	0.005 mg/L
Carbon Tetrachloride	0.005 mg/L
1,2-Dichlorobenzene	0.6 mg/L
1,4-Dichlorobenzene	0.075 mg/ L
1,2 Dichloroethane	0.005 mg/L
1,1 Dichloroethylene	0.007 mg/L
Cis-1,2-Dichloroethylene	0.07 mg/L
Trans 1,2 Dichloroethylene	0.1 mg/L
Dichloromethane	0.005 mg/L
1,2 Dichloropropane	0.005 mg/L
Ethylbenzene	0.7 mg/L
Methyl tert Butyl Ether (MTBE)	0.01 mg/L
Monochlorobenzene	0.1 mg/L
Styrene	0.1 mg/L
Tetrachloroethylene[1,2,3]	0.001 mg/L
Toluene	1 mg/L
1,2,4-Trichlorobenzene	0.07 mg/L
1,1,1-Trichloroethane	0.2 mg/L
1,1,2-Trichloroethane	0.005 mg/L
Trichloroethylene[1,2,3]	0.001 mg/L
Vinyl Chloride[1,2,3]	0.001 mg/L
Xylenes (total)	10 mg/L

[1]The MCL for these compounds will be lowered to 0.001 mg/L effective January 1, 2013.

[2]Systems that meet the federal MCL of 0.005 mg/L on January 1, 2013 effective date yet do not comply with the 0.001 mg/L shall have until January 1, 2015 to reach compliance.

[3]For enforcement purposes during the transition period from January 1, 2013 until January 1, 2015 any water system not meeting the MCL of 0.001 mg/L on January 1, 2013, shall continue to be monitored for enforcement purposes at the federal MCL of 0.005 mg/L until January 1, 2015. On January 1, 2015 the state MCL of 0.001 mg/L goes into full effect.

9.2.2 Sampling, Analytical Requirements and Compliance Determination for Contaminants Listed in subsections 9.2.1.1, 9.2.1.2 and 9.2.1.3:

9.2.2.1 Monitoring of the contaminants listed in subsection 9.2.1.1 for the purposes of determining compliance with the MCLs shall be conducted as follows:

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

9.2.2.1.2 Surface water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. (NOTE: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources).

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

9.2.2.1.4 Monitoring frequency:

9.2.2.1.4.1 Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in subsection 9.2.1.1 during each compliance period beginning with the compliance period starting January 1, 1993.

9.2.2.1.4.2 Systems serving more than 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of two quarterly samples in one year during each repeat compliance period.

9.2.2.1.4.3 Systems serving less than or equal to 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of one sample during each repeat compliance period.

9.2.2.1.5 Each community and non-transient water system which does not detect a contaminant listed in subsection 9.2.1.1 may apply to the Division for a waiver from the requirement of subsection 9.2.2.1.4.1 upon completion of the initial monitoring. A system must reapply for a waiver at the end of each compliance period.

9.2.2.1.6 The Division may grant a waiver after evaluating the following factors: Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the Division reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted. If previous use of the contaminant is unknown, or it has been used previously, then the following factors shall be used to determine whether a waiver is granted:

9.2.2.1.6.1 Previous analytical results.

9.2.2.1.6.2 The proximity of the system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near water treatment facilities or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities. Non-point sources include the use of pesticides to control insect and weed pests on agricultural areas, forest lands, home and gardens, and other land application uses.

9.2.2.1.6.3 The environmental persistence and transport of the pesticide or PCBs.

9.2.2.1.6.4 How well the water source is protected against contamination due to such factors as depth of the well, the type of soil and the integrity of the well casing.

9.2.2.1.6.5 Elevated nitrate levels at the water supply source.

9.2.2.1.6.6 Use of PCBs in equipment used in the production, storage or distribution of water (i.e., PCBs used in pumps, transformers, etc.).

9.2.2.1.7 If an organic contaminant listed in subsection 9.2.1.1 is detected in any sample then:

9.2.2.1.7.1 Each system must monitor quarterly at each sampling point which resulted in a detection.

9.2.2.1.7.2 The Division may decrease the quarterly monitoring requirement specified in subsection 9.2.2.7.1 provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Division make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system take a minimum of four quarterly samples.

9.2.2.1.7.3 After the Division determines the system is reliably and consistently below the maximum contaminant level the Division may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter that previously yielded the highest analytical result.

9.2.2.1.7.4 Systems which have 3 consecutive annual samples with no detection of a contaminant may apply to the Division for a waiver as specified in subsection 9.2.2.1.6.

9.2.2.1.7.5 If monitoring results in detection of one or more of certain related contaminants (heptachlor or heptachlor epoxide), then subsequent monitoring shall analyze for all related contaminants.

9.2.2.1.8 Systems which violate the MCL listed in subsection 9.2.1.1 must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the Division determines the system to be reliably and consistently below the MCL as specified in subsection 9.2.2.1.11, the system shall monitor at the frequency specified in subsection 9.2.2.1.7.3.

9.2.2.1.9 The Division may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Division, the result must be averaged with the first sampling result and the average used for the compliance determination as specified in subsection 9.2.2.1.11. The Division has the discretion to delete results of obvious sampling errors from this calculation.

9.2.2.1.10 The Division may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed. Detection Limit must be less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collections.

9.2.2.1.10.1 If the concentration in the composite sample detects one or more contaminants listed in subsection 9.2.1.1 then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.

9.2.2.1.10.2 If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these duplicates instead of resampling. The duplicate must be analyzed and the results reported to the Division within 14 days of collection.

9.2.2.1.10.3 If the population served by the system is >3,300 persons, then compositing may only be permitted by the Division at sampling points within a single system. In systems serving <3,300 persons, the Division may permit compositing among different systems provided the 5-sample limit is maintained.

9.2.2.1.11 Compliance with subsection 9.2.1.1 shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of the MCL, the system is in violation of the MCL.

9.2.2.1.11.1 For systems which are conducting monitoring at a frequency greater than annually, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any samples below the detection limit shall be calculated as zero for purposes of determining the annual average.

9.2.2.1.11.2 If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Division, the determination of compliance will be based on the average of the two samples.

9.2.2.1.11.3 If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.

9.2.2.1.11.4 If a system fails to collect the required number of samples, compliance will be based on the total number of samples collected.

9.2.2.1.11.5 If a sample result is less than the detection limit, zero will be used to calculate the annual average.

9.2.2.1.11.6 If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Division may allow the system to give public notice to only that portion of the system which is out of compliance.

9.2.2.1.12 Analysis for the contaminants listed in subsection 9.2.1.1 shall be conducted in accordance with 40 CFR 141.24(e). Copies may be obtained from the Office of Drinking Water.

9.2.2.1.13 Analysis for PCBs shall be conducted as follows:

9.2.2.1.13.1 Each system which monitors for PCBs shall analyze each sample in accordance with 40 CFR 141.24(h)(13)(i) (see subsection 9.2.2.13.2). Copies may be obtained from the Office of Drinking Water.

9.2.2.1.13.2 If PCBs (as one of seven Aroclors) are detected (as designated in this 40 CFR 141.24(h)(13)(ii)) in any sample analyzed using subsection 9.2.2.13.1, the system shall reanalyze the sample in accordance with 40 CFR 141.24(h)(13)(ii) to quantitate PCBs (as decachlorobiphenyl). Copies may be obtained from the Office of Drinking Water.

9.2.2.1.13.3 Compliance with the PCB MCL shall be determined based upon the quantitative results of analyses conducted in accordance with 40 CFR 141.24(h)(13)(iii). Copies may be obtained from the Office of Drinking Water.

9.2.2.1.14 If monitoring data collected after January 1, 1990, are generally consistent with the requirements of subsection 9.2.2, then the Division may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

9.2.2.1.15 The Division may increase the required monitoring frequency, where necessary, to detect variations within the system (e.g., fluctuations in concentration due to seasonal use, changes in water source).

9.2.2.1.16 The Division has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

9.2.2.1.17 Each public water system shall monitor at the time designated by the Division within each compliance period.

9.2.2.1.18 Detection as used in this paragraph shall be defined as found in 40 CFR 141.24(h)(18). Copies may be obtained from the Office of Drinking Water.

9.2.2.1.19 Analysis under this section shall only be conducted by laboratories that have received certification by EPA or the Division and have met the following conditions:

9.2.2.1.19.1 To receive certification to conduct analyses for the contaminants in subsections 9.2.1.1 and 9.2.1.3 the laboratory must:

9.2.2.1.19.1.1 Analyze Performance Evaluation samples annually in accordance with subsection 1.14.

9.2.2.1.19.1.2 The laboratory shall achieve quantitative results on the analyses that are within the acceptance limits: specified in 40 CFR 141.24(h)(19)(i)(B). Copies may be obtained from the Office of Drinking Water.

9.2.2.1.20 All new systems or systems that use 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 Division. The system must also comply with the initial sampling frequencies specified by the Division to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted with the requirements in this section.

[~~9.2.2.2~~ ~~Sampling, Analytical Requirements and Compliance Determination for Contaminants Listed in 9.2.1.2:~~

~~9.2.2.2.1~~ ~~Monitoring of contaminants listed in 9.2.1.2 for the purpose of determining compliance with the MCLs listed in subsection 9.2.1.2 shall be conducted as follows:~~

~~9.2.2.2.1.1~~ ~~Community water systems which serve a population of 10,000 or more individuals and which add a disinfectant (oxidant) to the water in any part of the drinking water treatment process shall analyze for total trihalomethanes in accordance with this section. For the purpose of this section, the minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the~~

~~system, except that multiple wells drawing raw water from a single aquifer may, with the Division's approval, be considered one treatment plant for determining the minimum number of samples. All samples taken within an established frequency shall be collected within a twenty-four (24) hour period.~~

~~9.2.2.2.1.2 For all community water systems utilizing surface water sources in whole or part, and for all community water systems utilizing only ground water sources that have not been determined by the Division to qualify for the monitoring requirements of subsections 9.2.2.2.1.3 and 9.2.2.2.1.4, analyses for total trihalomethanes shall be performed at quarterly intervals on at least four (4) water samples from each treatment plant used by the systems. At least twenty-five (25) percent of the samples shall be taken at locations within the distribution system reflecting the maximum residence time of the water in the system. The remaining seventy-five (75) percent shall be taken at representative locations in the distribution system taking into account number of persons served, different sources of water and different treatment methods employed. The results of all analyses per quarter shall be arithmetically averaged and reported to the division within ten (10) days of the end of the quarter in which the samples were collected. All samples collected shall be used in the computation of the average, unless the analytical results are invalidated for technical reasons. Sampling and analyses shall be conducted in accordance with the methods listed in subsection 9.2.2.2.1.6.~~

~~9.2.2.2.1.3 The monitoring frequency required by subsection 9.2.2.2.1.2 may be reduced by the Division to a minimum of one (1) sample analyzed for contaminants listed in 9.2.1.2 per quarter taken at a point in the distribution system reflecting the maximum residence time of the water in the system, upon written determination by the Division that the data from at least one (1) year of monitoring in accordance with subsection 9.2.2.2.1.2 and local conditions demonstrate that total trihalomethane concentrations will be consistently below the PMCL.~~

~~9.2.2.2.1.4 If at any time during which the reduced monitoring frequency prescribed under this paragraph applies, the results from any analysis exceed 0.10 mg/L of TTHMs and such results are confirmed by at least one (1) check sample taken promptly after such results are received, or if the system makes any significant change to its source of water or treatment program, the system shall immediately begin monitoring in accordance with the requirements of subsection 9.2.2.2.1.2, which monitoring shall continue for at least one (1) year before the frequency may be reduced again. At the option of the Division, a system's monitoring frequency may and should be increased above the minimum in those cases where it is necessary to detect variations of TTHM levels within the distribution system.~~

~~9.2.2.2.1.5 The monitoring frequency required by subsection 9.2.2.2.1.2 may be reduced by the Division for ground water supplies to a minimum of one (1) sample for maximum TTHM potential per year for each treatment plant used by the system taken at a point in the distribution system reflecting maximum residence time of the water in the system. The system shall submit to the Division the results of at least one (1) sample analyzed for maximum TTHM potential for each treatment plant used by the system taken at a point in the distribution system. The system's monitoring frequency may only be reduced by the Division when, based upon the data, the system has a maximum TTHM potential of less than 0.10 mg/L and when, based upon an assessment of local conditions of the system, the system is not likely to approach or exceed the PMCL for TTHMs. The results of all analyses shall be reported to the Division within thirty (30) days of the system's receipt of such results. All samples collected shall be used for determining whether the system must comply with the monitoring requirements of subsections 9.2.2.2.1.2, 9.2.2.2.1.3 and 9.2.2.2.1.4, unless the analytical results are invalidated for technical reasons. Sampling and analyses shall be conducted in accordance with the methods listed in subsection 9.2.2.2.1.8.~~

~~9.2.2.2.1.6 If at any time during which the reduced monitoring frequency prescribed under subsection 9.2.3.5 applies, the results from any analyses taken by the system for maximum TTHM potential are equal to or greater than 0.10 mg/L, and such results are confirmed by at least one (1) check sample taken promptly after such results are received, the system shall immediately begin monitoring in accordance with the requirements of subsections 9.2.2.2.1.2, 9.2.2.2.1.3 and 9.2.2.2.1.4 and such monitoring shall continue for at least one (1) year before the frequency may be reduced again. In~~

the event of any significant change to the system's raw water or treatment program, the system shall immediately analyze an additional sample for maximum TTHM potential taken at a point in the distribution system reflecting maximum residence time of the water in the system for the purpose of determining whether the system must comply with the monitoring requirements of subsections 9.2.2.2.1.2, 9.2.2.2.1.3 and 9.2.2.2.1.4. At the option of the Division, monitoring frequencies may and should be increased above the minimum in those cases where this necessary to detect variations of TTHM levels within the distribution system.

9.2.2.2.1.7 Compliance with subsection 9.2.1.2 shall be determined based on running annual average of quarterly samples collected by the system as prescribed in subsections 9.2.2.2.1.2 or 9.2.2.2.1.3. If the average of samples covering any twelve (12) month period exceeds the PMCL, the supplier of water shall report to the Division pursuant to subsection 4.1 and notify the public pursuant to subsection 4.2. Monitoring after public notification shall be at a frequency designated by the Division and shall continue until a monitoring schedule as a condition to an enforcement action shall become effective.

9.2.2.2.1.8 Sampling and analyses pursuant to this section shall be conducted in accordance with 40 CFR 141.24(e). Copies may be obtained from the Office of Drinking Water.

9.2.2.2.1.9 Before a community water system makes any significant modifications to its existing treatment process for the purposes of achieving compliance with subsection 9.2.1.2, such system must submit and obtain Division approval of a detailed plan setting forth its proposed modification and those safeguards that it will implement to ensure that the bacteriological quality of the drinking water served by such system will not be adversely affected by such modification. Each system shall comply with the provisions set forth in the Division approved plan. At a minimum, a Division approved plan shall require the system modifying its disinfection practice to:

9.2.2.2.1.9.1 Evaluate the water system for sanitary defects and evaluate the source water for biological quality.

9.2.2.2.1.9.2 Evaluate its existing treatment practice and consider improvements that will minimize disinfectant demand and optimize finished water quality throughout the distribution system.

9.2.2.2.1.9.3 Provide baseline water quality survey data of the distribution system. Such data should include the results from monitoring for coliform and fecal coliform bacteria, fecal streptococci, standard plate counts at 35ºC and 20ºC, phosphate, ammonia, nitrogen and total organic carbon. Virus studies should be required where source waters are heavily contaminated with sewage effluent.

9.2.2.2.1.9.4 Conduct additional monitoring to assure continued maintenance of optimal biological quality in finished water, for example, when chloramines are introduced as disinfectants or when pre-chlorination is being discontinued. Additional monitoring should also be required by the Division for chlorate, chlorite and chlorine dioxide when chlorine dioxide is used as a disinfectant. Standard plate count analyses should also be required by the division as appropriate before and after any modifications.

9.2.2.2.1.9.5 Demonstrate an active disinfectant residual of >0.04 mg/L throughout the distribution system at all times during and after the modification.

9.2.2.2.1.10 The requirements in subsections 9.2.2.2.1.1 through 9.2.2.2.1.7 apply to surface water or ground water under the direct influence of surface water community water systems which serve a population of 10,000 or more until December 16, 2001. The requirements in subsections 9.2.2.2.1.1 through 9.2.2.2.1.7 apply to community water systems which use only ground water not under the direct influence of surface water that add a disinfectant (oxidant) in any part of the treatment process and serve a population of 10,000 or more until December 16, 2003. After December 16, 2003, this section is no longer applicable.

9.2.2.2.1.11 Compliance dates for DBPs.

9.2.2.2.1.11.1 CWSs and NTNCWS. Surface water or ground water under the direct influence of surface water systems serving 10,000 or more persons must comply with this section beginning December 16, 2001. Surface water or ground water under the direct influence of surface water systems serving fewer than 10,000

~~persons and systems using only ground water not under the direct influence of surface water must comply with this section beginning December 16, 2003.~~

~~9.2.2.2.1.11.2 A system that is installing GAC or membrane technology to comply with this section may apply to the Division for an extension of up to 24 months past the dates in subsection 9.2.2.2.11.1, but not beyond December 16, 2003. In granting the extension, States must set a schedule for compliance and may specify any interim measures that the system must take. Failure to meet the schedule or interim treatment requirements constitutes a violation of a National Primary Drinking Water Regulation.]~~

9.2.2.**[~~3~~2]** Sampling, Analytical Requirements and Compliance Determination for VOCs: Monitoring of the contaminants listed in subsection 9.2.1.3 for the purpose of determining compliance with the MCLs shall be conducted as follows:

9.2.2.**[~~3~~2]**.1 Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). If conditions warrant, the Division may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determine consumer exposure. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

9.2.2.**[~~3~~2]**.2 Surface water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). If conditions warrant, the Division may designate additional sampling points within the distribution system or at the consumer's tap which more accurately determines consumer exposure. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system. NOTE: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground surfaces.

9.2.2.**[~~3~~2]**.3 If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

9.2.2.**[~~3~~2]**.4 Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in subsection 9.2.1.3, during each compliance period beginning in the initial compliance period.

9.2.2.**[~~3~~2]**.5 Groundwater and surface water systems which do not detect one of the contaminants listed in subsection 9.2.1.3 after conducting the initial round of monitoring required in subsection 9.2.2.**[~~3~~2]**.4 of this section may take one sample annually.

9.2.2.**[~~3~~2]**.6 For groundwater and surface water systems, if the initial monitoring for contaminants listed in subsection 9.2.1.3 as allowed in subsection 9.2.2.**[~~3~~2]**.18 has been completed by December 31, 1992 and the system did not detect any contaminant listed in subsection 9.2.1.3 then the system shall take one sample annually. After a minimum of three years of annual sampling, the Division may allow groundwater systems which have no previous detection of any contaminant listed in subsection 9.2.1.3 to take one sample during each compliance period.

9.2.2.**[~~3~~2]**.7 Each community and non-transient non-community groundwater system which does not detect a contaminant listed in subsection 9.2.1.3 may apply to the Division for a waiver from the requirement of subsections 9.2.2.**[~~3~~2]**.5 and 9.2.2.**[~~3~~2]**.6 after completing the initial monitoring. (For the purposes of this section, detection is defined as >0.0005 mg/L). A waiver shall be effective for no more than six years (two compliance periods).

9.2.2.**[~~3~~2]**.7.1The Division may also issue waivers to small systems (those serving ≤3,300 persons) for the initial round of monitoring for 1,2,4-trichlorobenzene.

9.2.2.**[~~3~~2]**.8 The Division may grant a waiver after evaluating the following factor(s):

9.2.2.**[~~3~~2]**.8.1Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the Division reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted.

9.2.2.**[~~3~~2]**.8.2If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

9.2.2.**[~~3~~2]**.8.2.1 Previous analytical results.

9.2.2.**[~~3~~2]**.8.2.2 The proximity of the system to potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.

9.2.2.**[~~3~~2]**.8.2.3 The environmental persistence and transport of the contaminants.

9.2.2.**[~~3~~2]**.8.2.4 The number of persons served by the public water system and the proximity of a smaller system to a larger system.

9.2.2.**[~~3~~2]**.8.2.5 How well the water source is protected against contamination such as whether it is a surface or groundwater system. Groundwater systems must consider factors such as depth of the well, the type of soil, and well head protection. Surface water systems must consider watershed protection.

9.2.2.**[~~3~~2]**.9 As a condition of the waiver a system must take one sample at each sampling point during the time the waiver is effective (i.e., one sample during two compliance periods or six years) and update its vulnerability assessment considering the factors listed in subsection 9.2.2.**[~~3~~2]**.8. Based on this vulnerability assessment the Division must confirm that the system is non-vulnerable. If the Division does not make this reconfirmation within three years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in subsection 9.2.2.**[~~3~~2]**.5.

9.2.2.**[~~3~~2]**.10Each community and non-transient non-community surface water system which does not detect a contaminant listed is subsection 9.2.1.3 may apply to the Division for a waiver from the requirements of subsection 9.2.2.**[~~3~~2]**.6 after completing the initial monitoring. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Systems meeting this criterion must be determined by the Division to be non-vulnerable based on a vulnerability assessment during each compliance period. Each system receiving a waiver shall sample at the frequency specified by the Division (if any).

9.2.2.**[~~3~~2]**.11If a contaminant listed in subsection 9.2.1.3, excluding vinyl chloride, is detected at a level exceeding 0.0005 mg/L in any sample then:

9.2.2.**[~~3~~2]**.11.1The system must monitor quarterly at each sampling point which resulted in a detection.

9.2.2.**[~~3~~2]**.11.2The Division may decrease the quarterly monitoring requirement specified in subsection 9.2.2.**[~~3~~2]**.11.1 provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Division make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

9.2.2.**[~~3~~2]**.11.3If the Division determines that the system is reliably and consistently below the MCL, the Division may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result.

9.2.2.**[~~3~~2]**.11.4Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Division for a waiver as specified in subsection 9.2.2.**[~~3~~2]**.7.

9.2.2.**[~~3~~2]**.11.5Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, trans-1,2-dichloroethylene, 1,1,1-trichloroethane, cis-1,2-dichloroethylene or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the Division may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period. Surface water systems are required to monitor for vinyl chloride as specified by the Division.

9.2.2.**[~~3~~2]**.12Systems which violate the requirements of subsection 9.2.1.3 as determined by subsection 9.2.2.**[~~3~~2]**.15 must monitor quarterly. After a minimum of four consecutive quarterly samples shows the system is in compliance as specified in subsection 9.2.2.3.15, and the Division determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and time specified in subsection 9.2.2.3.11.3.

9.2.2.**[~~3~~2]**.13The Division may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Division, the result must be averaged with the first sampling result and the average is used for the compliance determination as specified by subsection 9.2.2.**[~~3~~2]**.15. The Division has the discretion to delete results of obvious sampling errors from this calculation.

9.2.2.**[~~3~~2]**.14The Division may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, providing that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.

9.2.2.**[~~3~~2]**.14.1If the concentration in the composite sample is >0.0005 mg/L for any contaminant listed in subsection 9.2.1.3, then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.

9.2.2.**[~~3~~2]**.14.2If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicate must be analyzed and the results reported to the Division within 14 days of collection.

9.2.2.**[~~3~~2]**.14.3If the population served by the system is >3,300 persons, then compositing may only be permitted by the Division at sampling points within a single system. In systems serving ≤3,300 persons, the Division may permit compositing among different systems provided the 5-sample limit is maintained.

9.2.2.**[~~3~~2]**.14.4Compositing samples prior to GC analysis:

9.2.2.**[~~3~~2]**.14.4.1Add 5 ml or equal larger amounts of each sample (up to 5 samples are allowed) to a 25 ml glass syringe. Special precautions must be made to maintain zero headspace in the syringe.

9.2.2.**[~~3~~2]**.14.4.2The samples must be cooled at 4o C during this step to minimize volatilization losses.

9.2.2.**[~~3~~2]**.14.4.3Mix well and draw out a 5-ml aliquot for analysis.

9.2.2.**[~~3~~2]**.14.4.4Follow sample introduction, purging and desorption steps described in the method.

9.2.2.**[~~3~~2]**.14.4.5If less than five samples are used for compositing, a proportionately small syringe may be used.

9.2.2.**[~~3~~2]**.14.5Compositing samples prior to GC/MS analysis:

9.2.2.**[~~3~~2]**.14.5.1Inject 5-ml or equal larger amounts of each aqueous sample (up to 5 samples are allowed) into a 25-ml purging device using the sample introduction technique described in the method.

9.2.2.**[~~3~~2]**.14.5.2The total volume of the sample in the purging device must be 25 ml.

9.2.2.**[~~3~~2]**.14.5.3Purge and desorb as described in the method.

9.2.2.**[~~3~~2]**.15Compliance with subsection 9.2.1.3 shall be determined based on the analytical results obtained at each sampling point:

9.2.2.**[~~3~~2]**.15.1For systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any samples below the detection limit shall be calculated as zero for purposes of determining the annual average.

9.2.2.**[~~3~~2]**.15.2If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Division, the determination of compliance will be based on the average of the two samples.

9.2.2.**[~~3~~2]**.15.3If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Division may allow the system to give public notice to only that area served by that portion of the system which is out of compliance.

9.2.2.**[~~3~~2]**.16Analysis for the contaminants listed in subsection 9.2.1.3 shall be conducted in accordance with 40 CFR 141.24(e). Copies may be obtained from the Office of Drinking Water.

9.2.2.**[~~3~~2]**.17Analysis under this section shall only be conducted by laboratories that have received approval by EPA or the Division according to the following conditions:

9.2.2.**[~~3~~2]**.17.1 To receive conditional approval to conduct analyses for the contaminants in subsection 9.2.1.3, excluding vinyl chloride, the laboratory must:

9.2.2.**[~~3~~2]**.17.1.1Analyze Performance Evaluation samples annually.

9.2.2.**[32]**.17.1.2Achieve the quantitative acceptance limits for at least 80 percent of the regulated organic chemicals listed in subsection 9.2.1.3.

9.2.2.**[32]**.17.1.3Achieve quantitative results on the analyses performed under subsection 9.2.2.3.16 that are within ±20 percent of the actual amount of the substances in the Performance Evaluation sample when the actual amount is greater than or equal to 0.010 mg/L.

9.2.2.**[32]**.17.1.4Achieve quantitative results on the analyses performed under subsection 9.2.2.**[32]**.16 that are within ±40 percent of the actual amount of the substance in the Performance Evaluation sample when the actual amount is less than 0.010 mg/L.

9.2.2.**[32]**.17.1.5Achieve a method detection limit of 0.0005 mg/L according to the procedures listed in Appendix B of 40 CFR Part 136. Copies may be obtained from the Office of Drinking Water.

9.2.2.**[32]**.17.1.5.1Reserved

9.2.2.**[32]**.17.2 To receive certification for vinyl chloride, the laboratory must:

9.2.2.**[32]**.17.2.1Analyze Performance Evaluation samples annually.

9.2.2.**[32]**.17.2.2Achieve quantitative results on the analyses performed under subsection 9.2.4.17.2.1 that are within +40 percent of the actual amount of vinyl chloride in the Performance Evaluation sample.

9.2.2.**[32]**.17.2.3Achieve a method detection limit of 0.0005 mg/l, according to the procedures listed in Appendix B of 40 CFR Part 136. Copies may be obtained from the Office of Drinking Water.

9.2.2.**[32]**.17.2.4Obtain certification for the contaminants listed in subsection 9.2.1.3.

9.2.2.**[32]**.18The Division may allow the use of monitoring data collected after January 1, 1988 for purposes of initial monitoring compliance. If the data are generally consistent with the other requirements in this section, the Division may use those data (i.e., a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of subsection 9.2.2.**[32]**.4.

9.2.2.**[32]**.18.1 Systems which use grandfathered samples and did not detect any contaminant listed in subsection 9.2.1.3, excluding vinyl chloride, shall begin monitoring annually in accordance with subsection 9.2.2.**[32]**.6 beginning with the initial compliance period.

9.2.2.**[32]**.19The Division may increase required monitoring where necessary to detect variations within the system.

9.2.2.**[32]**.20Each approved laboratory must determine the method detection limit (MDL), as defined in Appendix B of 40 CFR Part 136, copies may be obtained from the Office of Drinking Water, at which it is capable of detecting VOCs. The acceptable MDL is 0.0005 mg/L. This concentration is the detection concentration for purposes of this section.

9.2.2.**[32]**.21Each public water system shall monitor at the time designated by the Division within each compliance period.

9.3 Best Available Technologies (BAT)

9.3.1 The Division hereby identifies as indicated in the table below either granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX) through chlorination or ozonation as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in subsections 9.2.1.1 and 9.2.1.3.

BAT for Organic Contaminants Listed in subsections 9.2.1.1 and 9.2.1.3

Chemical	gac	pta	ox
Alachlor		X	
Atrazine		X	
Benzene		X	X
Benzo(a)pyrene	X		
Carbofuran		X	
Carbon tetrachloride		X	X
Chlordane		X	

2,4-D	X		
Dalapon	X		
Dibromochloropropane (DBCP)		X	X
o-Dichlorobenzene	X	X	
1,2-Dichloroethane	X	X	
cis-1,2-Dichloroethylene	X	X	
trans-1,2-Dichloroethylene	X	X	
1,1-Dichloroethylene	X	X	
Dichloromethane		X	
1,2-Dichloropropane	X	X	
Di(2-ethylhexyl)adipate	X	X	
Di(2-ethylhexyl)phthalate	X		
Dinoseb	X		
Diquat	X		
Endothall	X		
Endrin	X		
Ethylene Dibromide (EDB)		X	X
Ethylbenzene		X	X
Glyphosate			X
Heptachlor		X	
Heptachlor epoxide		X	
Hexachlorobenzene	X		
Hexachlorocyclopentadiene	X	X	
Lindane		X	
Methoxychlor		X	
Monochlorobenzene		X	X
Oxamyl (Vydate)	X		
para-Dichlorobenzene	X		
Polychlorinated biphenyls (PCB)		X	
Pentachlorophenol		X	
Picloram		X	
Simazine	X		
Styrene	X		
2,4,5-TP (Silvex)		X	X
Tetrachloroethylene		X	X
1,2,4-Trichlorobenzene	X	X	
1,1,1-Trichloroethane	X	X	
1,1,2-Trichloroethane	X	X	
Trichloroethylene		X	X
Toluene		X	

Toxaphene		X	X
2,3,7,8-TCDD (Dioxin)	X		
Vinyl chloride		X	
Xylene		X	X

BAT for Organic Contaminants Listed in subsection 9.2.1.2

TTHM	Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant
HAA5	Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant
Bromate	Control of ozone treatment process to reduce production of bromate
Chlorite	Control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels

[9.3.1.1 The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for TTHM and HAA5 identified in subsection 9.2.1.2 for all systems that disinfect their source water:

Disinfection Byproduct	**Best Available Technology**
Total trihalomethanes (TTHM) and Haloacetic acids (five) (HAA5)	**Enhanced coagulation or enhanced softening, plus GAC10; or nanofiltration with a molecular weight cutoff ≤1000 Daltons; or GAC20.]**

9.3.1.**[1]2]** The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for TTHM and HAA5 identified in **[sub]**section 9.2.1.2 for consecutive systems and applies only to the disinfected water that consecutive systems buy or otherwise receive::

Disinfection Byproduct	Best Available Technology
Total trihalomethanes (TTHM) and Haloacetic acids (five) (HAA5)	Systems serving ≥10,000: Improved distribution system and storage tank management to reduce residence time, plus the use of chloramines for disinfectant residual maintenance Systems serving <10,000: Improved distribution system and storage tank management to reduce residence time

9.3.2 BAT for Inorganic Contaminants Listed in subsection 9.1.1.1

Chemical Name	BAT(s)
Antimony	2,7
Arsenic[4]	1,2,5,6,7,9,12[5]
Asbestos	2,3,8
Barium	5,6,7,9
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6[2],7
Cyanide	5,7,10

Mercury	2[1],4,6[1],71
Nickel	5,6,7
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2[3],6,7,9
Thallium	1,5

[1] BAT only if influent Hg concentrations <10 ug/l

[2] BAT for Chromium III only.

[3] BAT for Selenium IV only.

[4] BAT for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.

[5] To obtain high removals, iron to arsenic ratio must be at least 20:1.

Key to BATs in Table

1 = Activated Alumina

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

3 = Direct and Diatomite Filtration

4 = Granular Activated Carbon

5 = Ion Exchange

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

7 = Reverse Osmosis

8 = Corrosion Control

9 = Electrodialysis

10 = Chlorine

11 = Ultraviolet

12 = Oxidation/Filtration

9.3.3 Treatment techniques for acrylamide and epichlorohydrin.

9.3.3.1 Each public water system must certify annually in writing to the Division (using a third party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified as follows:

Acrylamide = 0.05% dosed at 1 PPM (or equivalent).

Epichlorohydrin = 0.01% dosed at 20 PPM (or equivalent).

9.3.4 The Administrator, U.S. Environmental Protection Agency, pursuant to section 1412 of the Safe Drinking Water Act, hereby identifies in the following table the affordable technology, treatment technique, or other means available to systems serving 10,000 persons or fewer for achieving compliance with the MCL for arsenic:

Small System Compliance Technologies (SSCTs)[1] for Arsenic[2]

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

Enhanced Lime Softening (pH>10.5)	All size categories
Ion Exchange	All size categories
Lime Softening[5]	501-3,300, 3,301-10,000
Oxidation/Filtration[7]	All size categories
Reverse Osmosis (centralized)[6]	501-3,300, 3,301-10,000
Reverse Osmosis (Point-of-Use)[4]	All size categories

[1]section 1412(b)(4)(E)(ii) of the Safe Drinking Water Act specifies that SSCTs must be affordable and technically feasible for small systems.

[2]SSCTs for Arsenic V. Preoxidation may be required to convert Arsenic III to Arsenic V.

[3]The Safe Drinking Water Act specifies three categories of small systems: (i) those serving 25 or more, but fewer than 501, (ii) those serving more than 500, but fewer than 3,301, and (iii) those serving more than 3,300, but fewer than 10,001.

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

[5]Unlikely to be installed solely for arsenic removal. May require pH adjustment to optimal range if high removals are needed.

[6]Technologies reject a large volume of water – may not be appropriate for areas where water quantity may be an issue.

[7]To obtain high removals, iron to arsenic ratio must be at least 20:1.

10.0 Lead (Pb) and Copper (Cu):

10.1 Unless otherwise indicated, each of the provisions of this section applies to CWSs and NTNCWSs. The requirements in Section 10.0 shall take effect November 9, 1992.

10.1.1 General Requirements: Applicability and effective dates.

10.1.1.1 The requirements of Section 10 constitute national primary drinking water regulations for lead and copper. Unless otherwise indicated, each of the provisions of this section applies to community water systems and non-transient, non-community water systems (hereinafter referred to as “water systems” or “systems”).

10.1.1.2 Reserved

10.1.2 Scope. These regulations establish a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumer’s taps.

10.1.3 Action Level:

10.1.3.1 The lead action level is exceeded if the concentration of lead in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with subsection 10.7 is greater than 0.015 mg/L (i.e., if the “90th percentile” lead level is greater than 0.015 mg/L).

10.1.3.2 The copper action level is exceeded if the concentration of copper in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with subsection 10.7 is greater than 1.3 mg/L (i.e., if the “90th percentile” copper level is greater than 1.3 mg/L).

10.1.3.3 The 90th percentile lead and copper levels shall be computed as follows:

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

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

10.1.3.3.3 The contaminant concentration in the numbered sample yielded by the calculation in subsection 10.1.3.3.2 is the 90th percentile contaminant level.

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

10.1.3.3.5 For a public water system that has been allowed by the Division to collect fewer than five samples in accordance with subsection 10.7.3 the sample result with the highest concentration is considered the 90th percentile value.

10.1.4 Corrosion Control Treatment Requirements:

10.1.4.1 All water systems shall install and operate optimal corrosion control treatment as defined in section 2.0.

10.1.4.2 Any water system that complies with the applicable corrosion control treatment requirements specified by the Division under subsections **[~~10.1.4 and 10.1.5~~ 10.2 and 10.3]** shall be deemed in compliance with each treatment requirement contained in subsection 10.1.4.1.

10.1.5 Source Water Treatment Requirements: Any system exceeding the lead or copper action level shall implement all applicable source water treatment requirements specified by the Division under subsection 10.4.

10.1.6 Lead Service Line Replacement: Any system exceeding the lead action level after implementation of applicable corrosion control and source water treatment requirements shall complete the lead service line replacement requirements contained in subsection 10.5.

10.1.7 Public Education Requirements: Pursuant to subsection 10.6, all water systems must provide a consumer notice of lead tap water monitoring results to persons served at the sites (taps) that are tested. Any system exceeding the lead action level shall implement the public education requirements contained in subsection 10.6.

10.1.8 Monitoring and Analytical Requirements: Tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results under this section shall be completed in compliance with subsections 10.7, 10.8, 10.9 and 10.12.

10.1.9 Reporting Requirements: Systems shall report to the Division any information required by the treatment provisions of this section and subsection 10.10.

10.1.10 Recordkeeping Requirements: Systems shall maintain records in accordance with subsection 10.11.

10.1.11 Violation of National Primary Drinking Water Regulations:

10.1.11.1 Failure to comply with the applicable requirements of Section 10 including requirements established by the Division pursuant to these provisions, shall constitute a violation of the national primary drinking water regulations for lead and/or copper.

10.2 Applicability of Corrosion Control Treatment Steps for Small, Medium-Size and Large Water Systems:

10.2.1 Systems shall complete the applicable corrosion control treatment requirements described in subsection 10.3 by the deadlines established in this section.

10.2.1.1 A large system (serving >50,000 persons) shall complete the corrosion control treatment steps specified in subsection 10.2.4, unless it is deemed to have optimized corrosion control under subsection 10.2.2.2 or 10.2.2.3.

10.2.1.2 A small system (serving <3,300 persons) and a medium-size system (serving >3,300 and <50,000 persons) shall complete the corrosion control treatment steps specified in paragraph 10.2.5, unless it is deemed to have optimized corrosion control under subsections 10.2.2.1, 10.2.2.2 or 10.2.2.3.

10.2.2 A system is deemed to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in this section if the system satisfies one of the following criteria specified in **[subsections]** 10.2.2.1 through 10.2.2.3. Any such system deemed to have optimized corrosion control under this paragraph, and which has treatment in place, shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the Division determines appropriate to ensure that optimal corrosion control treatment is maintained.

10.2.2.1 A small or medium-size water system is deemed to have optimized corrosion control if the system meets the lead and copper action levels during each of two consecutive six-month monitoring periods conducted in accordance with subsection 10.7.

10.2.2.2 Any water system may be deemed by the Division to have optimized corrosion control treatment if the system demonstrates to the satisfaction of the Division that it has conducted activities equivalent to the corrosion control steps applicable to such system under this section. If the Division makes this determination, it shall provide the systems with written notice explaining the basis for its decision and shall specify the water quality control parameters representing optimal

corrosion control in accordance with subsection 10.3.6. Water systems deemed to have optimized corrosion control under this paragraph shall operate in compliance with the Division-designated optimal water quality control parameters in accordance with subsection 10.3.7 and continue to conduct lead and copper tap and water quality parameter sampling in accordance with subsection 10.7.4.3 and subsection 10.8.4 respectively. A system shall provide the Division with the following information in order to support a determination under this paragraph.

10.2.2.2.1 The results of all test samples collected for each of the water quality parameters in subsection 10.3.3.3.

10.2.2.2.2 A report explaining the test methods used by the water system to evaluate the corrosion control treatments listed in subsection 10.3.3.1, the results of all tests conducted, and the basis for the system's selection of optimal corrosion control treatment.

10.2.2.2.3 A report explaining how corrosion control has been installed and how it is being maintained to insure minimal lead and copper concentrations at consumer's taps; and

10.2.2.2.4 The results of tap water samples collected in accordance with subsection 10.7 at least once every six months for one year after corrosion control has been installed.

10.2.2.3 Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with subsection 10.7 and source water monitoring conducted in accordance with subsection 10.9 that demonstrates for two consecutive six-month monitoring periods that the difference between the 90th percentile tap water lead level computed under [-subsection 10.1.**[~~1~~3]**.3, and the highest source water lead concentration, is less than the Practical Quantitation Level (PQL) for lead specified in subsection 10.12.

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

10.2.2.3.2 Any water system deemed to have optimized corrosion control in accordance with this paragraph shall continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in subsection 10.7.3 and collect the samples at times and locations specified in subsection 10.7.4.4. Any such system that has not conducted a round of monitoring pursuant to subsection 10.7.4 since September 30, 1997, shall complete a round of monitoring pursuant to this paragraph no later than September 30, 2000.

10.2.2.3.3 Any water system deemed to have optimized corrosion control pursuant to this paragraph shall notify the Division in writing pursuant to subsection 10.10.1.3 of any upcoming long-term change in treatment or addition of a new source as described in that section. The division must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Division may require any such system to conduct additional monitoring or to take other action the Division deems appropriate to ensure that such systems maintain minimal levels of corrosion in the distribution system.

10.2.2.3.4 As of July 12, 2001 a system is not deemed to have optimized corrosion control under this paragraph, **[and]** shall implement corrosion control treatment pursuant to subsection 10.2.2.3.5 unless it meets the copper action level.

10.2.2.3.5 Any system triggered into corrosion control because it is no longer deemed to have optimized corrosion control under this paragraph shall implement corrosion control treatment in accordance with the deadlines in subsection 10.2.5. Any such large system shall adhere to the schedule specified in that section for medium-sized systems, with the time periods for completing each step being triggered by the date the system is no longer deemed to have optimized corrosion control under this section.

10.2.3 Any small or medium-size water system that is required to complete the corrosion control steps due to its exceedance of the lead or copper action level may cease completing the treatment steps whenever the system meets both action levels during each of two consecutive monitoring periods conducted pursuant to subsection 10.7 and submits the results to the Division. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system (or the Division, as the case may be) shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The Division may require a system to repeat treatment steps previously completed by the system where the Division determines that this is necessary to properly implement the treatment requirements of this section. The Division shall notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small or medium-size

system to implement corrosion control treatment steps in accordance with subsection 10.2.5 (including systems deemed to have optimized corrosion control under subsection 10.2.2.1) is triggered whenever any small or medium-size system exceeds the lead or copper action level.

10.2.4 Treatment Steps and Deadlines for Large Systems:

10.2.4.1 Except as provided in subsections 10.2.2.2 and 10.2.2.3, large systems shall complete the following corrosion control treatment steps (described in the referenced portions of subsections 10.3, 10.7 and 10.8 by the indicated dates.

Step 1: The system shall conduct two six month initial monitoring periods by January 1, 1993.

Step 2: The system shall complete corrosion control studies, subsection 10.3.3, in 18 months, by July 1, 1994.

Step 3: The Division shall designate optimal corrosion control treatment, subsection 10.3.4, in 6 months, by January 1, 1995.

Step 4: The system shall install optimal corrosion control treatment, subsection 10.3.5, in 24 months, by January 1, 1997.

Step 5: The system shall complete follow-up sampling, subsection 10.7.4.2 and subsection 10.8.3, in 12 months, by January 1, 1998

Step 6: The Division shall review installation of treatment and designate optimal water quality control parameters, subsection 10.3.6, in 6 months, by July 1, 1998.

Step 7: The system shall operate in compliance with the Division-specified optimal water quality control parameters, subsection 10.3.7, and continue to conduct tap sampling, subsection 10.7.4 and subsection 10.8.4.

10.2.5 Treatment Steps and Deadlines for Small-and Medium-Size Systems:

10.2.5.1 Except as provided in subsection 10.2.2, small and medium-size systems shall complete the following corrosion control treatment steps (described in the referenced portions of subsections 10.3, 10.7 and 10.8 by the indicated time periods.

Step 1: The system shall conduct initial tap sampling, subsection 10.7.4.1 and subsection 10.8.2, until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under subsection 10.7.4.4. A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment, subsection 10.3.1, within six months after the end of the monitoring period during which it exceeds one of the action levels.

Step 2: Within 12 months after the end of the monitoring period during which a system exceeds the lead or copper action level, the Division may require the system to perform corrosion control studies (subsection 10.3.2). If the Division does not require the system to perform such studies, the Division shall specify optimal corrosion control treatment, (subsection 10.3.4) within the following time frames.

10.2.5.1.1 For medium-size systems, within 18 months after the end of the monitoring period during which such system exceeds the lead or copper action level.

10.2.5.1.2 For small systems, within 24 months after the end of the monitoring period during which such system exceeds the lead or copper action level.

Step 3: If the Division requires a system to perform corrosion control studies under step 2, the system shall complete the studies, subsection 10.3.3, within 18 months after the Division requires that such studies be conducted.

Step 4: If the system has performed corrosion control studies under step 2, the Division shall designate optimal corrosion control treatment, subsection 10.3.4, within 6 months after completion of step 3.

Step 5: The system shall install optimal corrosion control treatment, subsection 10.3.5, within 24 months after the Division designates optimal corrosion control treatment.

Step 6: The system shall complete follow-up sampling, subsection 10.7.4.2 and subsection 10.8.3, within 36 months after the Division designates optimal corrosion control treatment.

Step 7: The Division shall review the system's installation of treatment and designate optimal water quality control parameters, subsection 10.3.6, within 6 months after completion of Step 6.

Step 8: The system shall operate in compliance with the Division-designated optimal water quality control parameters, subsection 10.3.7, and continue to conduct tap sampling, subsection 10.7.4.3 and subsection 10.8.4.

10.3 Description of Corrosion Control Treatment Requirements: Each System shall complete the corrosion control treatment requirements described below which are applicable to such systems under subsection 10.2.

10.3.1 System Recommendation Regarding Corrosion Control Treatment: Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, small and medium-size water systems exceeding the lead or copper action level shall recommend installation of one or more of the corrosion control treatments listed in subsection 10.3.3.1 which the system believes constitutes optimal corrosion control for that system. The Division may require the system to conduct additional water quality parameter monitoring in accordance with subsection 10.8.2 to assist the Division in reviewing the system's recommendation.

10.3.2 Division Decision to Require Studies of Corrosion Control Treatment (Applicable to Small and Medium-Size Systems): The Division may require any small or medium-size system that exceeds the lead or copper action level to perform corrosion control studies under **[sub]**section 10.3.3 to identify optimal corrosion control treatment for the system.

10.3.3 Performance of Corrosion Control Studies:

10.3.3.1 Any public water system performing corrosion control studies shall evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for that system:

10.3.3.1.1 Alkalinity and pH adjustment;

10.3.3.1.2 Calcium hardness adjustment; and

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

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

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

Lead;

Copper;

pH;

Alkalinity;

Calcium;

Conductivity;

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

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

Water temperature.

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

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

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

10.3.3.**[45]** The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatments processes.

10.3.3.**[56]** On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the Division in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in subsections 10.3.3.1 through 10.3.3.5.

10.3.4 Division Designation of Optimal Corrosion Control Treatment:

10.3.4.1 Based upon consideration of available information including, where applicable, studies performed under subsection 10.3.3 and a system's recommended treatment alternative, the Division shall either approve the corrosion control treatment option recommended by the system, or designate alternative corrosion control treatment(s) from among those listed in subsection 10.3.3.1. When

designating optimal treatment the Division shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other quality treatment processes.

10.3.4.2 The Division shall notify the system of its decision on optimal corrosion control treatment in writing and explain the basis for this determination within 6 months of receiving follow up samples. If the Division requests additional information to aid its review, the water system shall provide the information.

10.3.5 Installation of Optimal Corrosion Control: Each system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated by the Division under subsection 10.3.4.

10.3.6 Division Review of Treatment and Specification of Optimal Water Quality Control Parameters: The Division shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the water system and determine whether the system has properly installed and operated the optimal corrosion control treatment designated by the Division in subsection 10.3.4. Upon reviewing the results of tap water and water quality parameter monitoring by the system, both before and after the system installs optimal corrosion control treatment, the Division shall designate:

10.3.6.1 A minimum value or a range of values for pH measured at each entry point to the distribution system;

10.3.6.2 A minimum pH value measured in all tap samples. Such value shall be equal to or greater than 7.0 unless the Division determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;

10.3.6.3 If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the Division determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system;

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

10.3.6.5 If calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples. The values for the applicable water quality control parameters listed above shall be those that the Division determines to reflect optimal corrosion control treatment for the system. The Division may designate values for additional water quality control parameters determined by the Division to reflect optimal corrosion control for the system. The Division shall notify the system in writing of these determinations and explain the basis for its decisions.

10.3.7 Continued Operation and Monitoring: All systems shall continue to operate and maintain optimal corrosion control treatment, including maintaining water quality parameter values at or above minimum values or within ranges designated by the Division under subsection 10.3.6 in accordance with this paragraph for all samples collected under subsection 10.8.4 through 10.8.6. Compliance with requirements of this paragraph shall be determined every six months, as specified under subsection 10.8.4. A water system is out of compliance with the requirements of this paragraph for a six-month period if it has excursions for any Division-specified parameter on more than nine days during the period. An excursion occurs whenever the daily value for one or more of the water quality parameters measured at a sampling location is below the minimum value or outside the range designated by the Division. Daily values are calculated as follows. The Division has the discretion to delete results of obvious sampling errors from this calculation.

10.3.7.1 On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the average of all the results collected during the day regardless of whether they are collected through continuous monitoring, grab sampling, or a combination of both. If EPA has approved an alternative formula under 40 CFR section 142.16 in the State's application for a program revision submitted pursuant to 40 CFR section 142.12, the Division's formula shall be used to aggregate multiple measurements taken at a sampling point for the water quality parameter.

10.3.7.2 On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value shall be that measurement.

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

10.3.8 Modification of Division's Corrosion Control Treatment Decision: Upon its own initiative, or in response to a request by the water system or other interested party, the Division may modify treatment determination.

The requests in writing must explain why the change is appropriate and provide supporting documentation. The treatment may be changed when the Division determines that it is necessary for the water system to continue optimizing corrosion control. The Division's decision must **[be in writing and]** specify new treatment, explain the basis for its decision, and provide **[~~for~~ an]** implementation **[schedule for completing the treatment modifications]**.

10.3.9 EPA Treatment Decisions in Lieu of the Division's Decisions: The regional administrator may issue federal determinations in lieu of the Division's determinations when:

10.3.9.1 The Division fails to issue a determination in a timely manner.

10.3.9.2 The Division abuses its discretion in a substantial number of cases or in cases affecting large populations.

10.3.9.3 The technical basis of the Division's decision is indefensible in federal enforcement action(s).

10.4 Source Water Treatment Requirements: Systems shall complete the applicable source water monitoring and treatment requirements (described in the referenced portions of subsection 10.4.2, and in subsections 10.7 and 10.9 by the following deadlines:

10.4.1 Deadlines for Completing Source Water Treatment Steps:

Step 1: A system exceeding the lead or copper action level shall complete lead and copper source water monitoring (subsection 10.9.2) and make a treatment recommendation to the Division (subsection 10.4.2.1) no later than 180 days after the end of the monitoring period during which the lead or copper action level was exceeded.

Step 2: The Division shall make a determination regarding source water treatment, subsection 10.4.2.2 within 6 months after submission of monitoring results under step 1.

Step 3: If the Division requires installation of source water treatment, the system shall install the treatment, subsection 10.4.2.3, within 24 months after completion of step 2.

Step 4: The system shall complete follow-up tap water monitoring, subsection 10.7.4.2, and source water monitoring, subsection 10.9.3, within 36 months after completion of step 2.

Step 5: The Division shall review the system's installation and operation of source water treatment and specify maximum permissible source water levels for lead and copper, subsection 10.4.2.4, within 6 months after completion of step 4.

Step 6: The system shall operate in compliance with the Division-specified maximum permissible lead and copper source water levels, subsection 10.4.2.4, and continue source water monitoring, subsection 10.9.4.

10.4.2 Description of Source Water Treatment Requirements:

10.4.2.1 System Treatment Recommendation: Any system which exceeds the lead or copper action level shall recommend in writing to the Division the installation and operation of one of the source water treatments listed in subsection 10.4.2.2. A system may recommend that no treatment be installed based upon a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.

10.4.2.2 Division Determination Regarding Source Water Treatment: The Division shall complete an evaluation of the results of all source water samples submitted by the water system to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps. If the Division determines that treatment is needed, the Division shall either require installation and operation of the source water treatment recommended by the system (if any) or require the installation and operation of another source water treatment from among the following: ion exchange, reverse osmosis, lime softening or coagulation/filtration. If the Division requests additional information to aid in its review, the water system shall provide the information by the date specified by the Division in its request. The Division shall notify the system in writing of its determination and set forth the basis for its decision.

10.4.2.3 Installation of Source Water Treatment: Each system shall properly install and operate the source water treatment designated by the Division under subsection 10.4.2.2.

10.4.2.4 Division Review of Source Water Treatment and Specification of Maximum Permissible Source Water Levels: The Division shall review the source water samples taken by the water system both before and after the system installs source water treatment, and determine whether the system has properly installed and operated the source water treatment designated by the Division. Based upon its review, the Division shall designate the maximum permissible lead and copper concentrations for finished water entering the distribution system. Such levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The Division shall notify the system in writing and explain the basis for its decision.

10.4.2.5 Continued Operation and Maintenance: Each water system shall maintain lead and copper levels below the maximum permissible concentrations designated by the Division at each sampling point monitored in accordance with subsection 10.9. The system is out of compliance with this paragraph if the level of lead or copper at any sampling point is greater than the maximum permissible concentration designated by the Division.

10.4.2.6 Modification of Division Treatment Decisions: Upon its own initiative or in response to a request by a water system or other interested party, the Division may modify its determination of the source water treatment under subsection 10.4.2.2, or maximum permissible lead and copper concentrations for finished water entering the distribution system under subsection 10.4.2.4. A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The Division may modify its determination where it concludes that such change is necessary to ensure that the system continues to minimize lead and copper concentrations in source water. A revised determination shall be made in writing and set forth the new treatment requirements, explain the basis for the Division's decision and provide an implementation schedule for completing the treatment modifications.

10.4.2.7 EPA Treatment Decisions in Lieu of the Division's Decisions: The regional administrator may issue federal determinations in lieu of the Division's determination when:

10.4.2.7.1 The Division fails to issue a determination in a timely manner.

10.4.2.7.2 The Division abuses its discretion in a substantial number of cases or in cases affecting large populations.

10.4.2.7.3 The technical basis of the Division's decision is indefensible in federal enforcement action(s).

10.5 Lead Service Line Replacement Requirements:

10.5.1 Systems that fail to meet the lead action level in tap samples taken pursuant to subsection 10.7.4.2 after installing corrosion control and/or source water treatment (whichever sampling occurs later) shall replace lead service lines in accordance with the requirements of this section. If a system is in violation of subsections 10.2 or 10.4 for failure to install source water or corrosion control treatment, the Division may require the system to commence lead service line replacement under this section after the date by which the system was required to conduct monitoring under subsection 10.7.4.2 has passed.

10.5.1.1 A system shall replace annually at least 7 percent of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The systems shall identify the initial number of lead service lines in its distribution system, including an identification of the portion(s) owned by the system, based upon a materials evaluation, including the evaluation required under subsection 10.7.1 and relevant legal authorities (e.g., contracts, local ordinances) regarding the portion owned by the system. The first year of lead service line replacement shall begin on the first day following the end of the monitoring period in which the action level was exceeded under subsection 10.5.1. If monitoring is required annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs. If the Division has established an alternate monitoring period, then the end of the monitoring period will be the last day of that period.

10.5.1.2 Any water system resuming a lead service line replacement program after the cessation of its lead service line replacement program as allowed by subsection 10.5.6 shall update its inventory of lead service lines to include those sites that were previously determined not to require replacement through the sampling provision under subsection 10.5.3. The system will then divide the updated number of remaining lead service lines by the number of remaining years in the program to determine the number of lines that must be replaced per year (7 percent lead service line replacement is based on a 15-year replacement program, so, for example, systems resuming lead service line replacement after previously conducting two years of replacement would divide the updated inventory by 13). For those systems that have completed a 15-year lead service line replacement program, the Division will determine a schedule for replacing or retesting lines that were previously tested under the replacement program when the system re-exceeds the action level.

10.5.**[3**~~3~~**2]**A system is not required to replace an individual lead service line if the lead concentration in all service line samples from that line taken pursuant to subsection 10.7.2.3, is less than or equal to 0.015 mg/L.

10.5.**[43]**A water system shall replace the entire service line (up to the building inlet) unless it demonstrates to the satisfaction of the Division under subsection 10.5.**[5**~~4~~**4]** that it controls less than the entire service line. In such cases, the system shall replace the portion of the line which the Division determines is under the

system's control. The system shall notify the user served by the line that the system will replace the portion of the service line under its control and shall offer to replace the building owner's portion of the line, but is not required to bear the cost of replacing the building owner's portion of the line. For buildings where only a portion of the lead service line is replaced, the water system shall inform the resident(s) that the system will collect a first flush tap water sample after partial replacement of the service line is completed if the resident(s) so desire. In cases where the resident(s) accept the offer, the system shall collect the sample and report the results to the resident(s) within 14 days following partial lead service replacement.

10.5.**[43]**.1 At least 45 days prior to commencing with the partial replacement of a lead service line, the water system shall provide notice to the resident(s) of all buildings served by the line explaining that they may experience a temporary increase in lead levels in their drinking water, along with guidance on measures consumers can take to minimize their exposure to lead. The Division may allow the water system to provide notice under the previous sentence less than 45 days prior to commencing partial lead service line replacement where such replacement is in conjunction with emergency repairs. In addition, the water system shall inform the resident(s) served by the line that the system will, at the system's expense, collect a sample from each partially-replaced lead service line that is representative of the water in the service line for analysis of lead content, as prescribed under subsection 10.7.2.3, within 72 hours after completion of the partial replacement of the service line. The system shall collect the sample and report the results of the analysis to the owner and the resident(s) served by the line within three business days of receiving the results. Mailed notices post-marked within three business days of receiving the results shall be considered "on time."

10.5.**[43]**.2 The water system shall provide the information required by subsection 10.5.**[43]**.1 to the residents of individual dwellings by mail or by other methods approved by the Division. In instances where multi-family dwellings are served by the line, the water system shall have the option to post the information at a conspicuous location.

10.5.**[~~5~~4]**A water system is presumed to control the entire lead service line (up to the building inlet) unless the system demonstrates to the satisfaction of the Division, in a letter submitted under subsection 10.10.5.4, that it does not have any of the following forms of control over the entire line (as defined by Division statutes, municipal ordinances, public service contracts or other applicable legal authority); authority to set standards for construction, repair, or maintenance of the line, authority to replace, repair, or maintain the service line, or ownership of the service line. The Division shall review the information supplied by the system and determine whether the system controls less than the entire service line, in such cases, shall determine the extent of the system's control. The Division's determination shall be in writing and explain the basis for its decision.

10.5.**[~~6~~5]**The Division shall require a system to replace lead service lines on a shorter schedule than that required by this section, taking into account the number of lead service lines in the system, where such a shorter replacement schedule is feasible. The Division shall make this determination in writing and notify the system of its finding within 6 months after the system is triggered into lead service line replacement based on monitoring referenced in subsection 10.5.1.

10.5.**[~~7~~6]**Any system may cease replacing lead service lines whenever first draw samples collected pursuant to subsection 10.7.2.2 meet the lead action level during each of two consecutive monitoring periods and the system submits the results to the Division. If the first draw samples in any such water system thereafter exceeds the lead action level, the system shall recommence replacing lead service lines, pursuant to subsection 10.5.1.2.

10.5.**[~~8~~7]**To demonstrate compliance with subsections 10.5.1 through 10.5.4, a system shall report to the Division the information specified in subsection 10.10.5.

10.6 Public education and supplemental monitoring requirements. All water systems must deliver a consumer notice of lead tap water monitoring results to persons served by the water system at sites that are tested, as specified in subsection 10.6.4. A water system that exceeds the lead action level based on tap water samples collected in accordance with subsection 10.7 shall deliver the public education materials contained in subsection 10.6.1 in accordance with the requirements of subsection 10.6.2. Water systems that exceed the lead action level must sample the tap water of any customer who requests it in accordance with subsection 10.6.3.

10.6.1 Content of written public education materials.

10.6.1.1 Community water systems and non-transient non-community water systems. Water systems must include the following elements in printed materials (e.g., brochures and pamphlets) in the same order as listed below. In addition, language in subsections 10.6.1.1.1 through 10.6.1.1.2 and 10.6.1.1.6 must be included in the materials, exactly as written, except for the text in brackets in

these sections for which the water system must include system-specific information. Any additional information presented by a water system must be consistent with the information below and be in plain language that can be understood by the general public. Water systems must submit all written public education materials to the Division prior to delivery. The Division may require the system to obtain approval of the content of written public materials prior to delivery.

10.6.1.1.1 IMPORTANT INFORMATION ABOUT LEAD IN YOUR DRINKING WATER [INSERT NAME OF WATER SYSTEM] found elevated levels of lead in drinking water in some homes/ buildings. Lead can cause serious health problems, especially for pregnant women and young children. Please read the information closely to see what you can do to reduce lead in your drinking water.

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

10.6.1.1.3 Sources of lead.

10.6.1.1.3.1 Explain what lead is.

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

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

10.6.1.1.4 Discuss the steps the consumer can take to reduce their exposure to lead in drinking water.

10.6.1.1.4.1 Encourage running the water to flush out the lead.

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

10.6.1.1.4.3 Explain that boiling water does not reduce lead levels.

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

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

10.6.1.1.5 Explain why there are elevated levels of lead in the system's drinking water (if known) and what the water system is doing to reduce the lead levels in homes/buildings in this area.

10.6.1.1.6 For more information, call us at [INSERT YOUR PHONE NUMBER] [(IF APPLICABLE), or visit our website at [INSERT YOUR WEBSITE HERE)]. For more information on reducing lead exposure around your home/building and the health effects of lead, visit EPA's Web site at http://www.epa.gov/lead or contact your health care provider.

10.6.1.2 Community water systems. In addition to including the elements specified in subsection 10.6.1.1 community water systems must:

10.6.1.2.1 Tell consumers how to get their water tested.

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

10.6.2 Delivery of public education material.

10.6.2.1 For public water systems serving a large proportion of non-English speaking consumers, as determined by the Division, 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.

10.6.2.2 A community water system that exceeds the lead action level on the basis of tap water samples collected in accordance with subsection 10.7, and that is not already conducting public education tasks under this section, must conduct the public education tasks under this section within 60 days after the end of the monitoring period in which the exceedance occurred:

10.6.2.2.1 Deliver printed materials meeting the content requirements of subsection 10.6.1 to all bill paying customers.

10.6.2.2.1.1 Contact customers who are most at risk by delivering education materials that meet the content requirements of subsection 10.6.1 to local public health agencies even if they are not located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users. The water system must contact the local public health agencies directly by phone or in person. The local public health agencies may provide a specific list of additional community based organizations serving target populations, which may include organizations outside the service area of the water system. If such lists are provided, systems must deliver education materials that meet the content requirements of subsection 10.6.1 to all organizations on the provided lists.

10.6.2.2.1.2 Contact customers who are most at risk by delivering materials that meet the content requirements of subsection 10.6.1 to the following organizations listed in **[subsection]** 10.6.2.2.2.2.1 through 10.6.2.2.2.2.6 that are located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users:

10.6.2.2.1.2.1 Public and private schools or school boards.

10.6.2.2.1.2.2 Women, Infants and Children (WIC) and Head Start Programs.

10.6.2.2.1.2.3 Public and private hospitals and medical clinics.

10.6.2.2.1.2.4 Pediatricians.

10.6.2.2.1.2.5 Family planning clinics.

10.6.2.2.1.2.6 Local welfare agencies.

10.6.2.2.1.3 Make a good faith effort to locate the following organizations within the service area and deliver materials that meet the content requirements of subsection 10.6.1 to them, along with an informational notice that encourages distribution to all potentially affected customers or users. The good faith effort to contact at-risk customers may include requesting a specific list of these organizations from the local public health agencies, even if the agencies are not located within the water system's service area:

10.6.2.2.1.3.1 Licensed childcare centers

10.6.2.2.1.3.2 Public and private preschools

10.6.2.2.1.3.3 Obstetricians-Gynecologists and Midwives.

10.6.2.2.3 No less often than quarterly, provide information on or in each water bill as long as the system exceeds the action level for lead. The message on the water bill must include the following statement exactly as written except for the text in brackets for which the water system must include system-specific information: [INSERT NAME OF WATER SYSTEM] found high levels of lead in drinking water in some homes. Lead can cause serious health problems. For more information please call [INSERT NAME OF WATER SYSTEM] [or visit (INSERT YOUR WEBSITE HERE)] The message or delivery mechanism can be modified in consultation with the Division; specifically, the Division may allow a separate mailing of public education materials to customers if the water system cannot place the information on water bills.

10.6.2.2.4 Post material meeting the content requirements of subsection 10.6.1 on the water system's website if the system serves a population greater than 100,000.

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

10.6.2.2.6 In addition to subsections 10.6.2.2.1 through 10.6.2.2.5, systems must implement at least three activities from one **[or more]** of the categories listed below. The educational content and selection of these activities must be determined in consultation with the Division.

10.6.2.2.6.1 Public Service Announcements.

10.6.2.2.6.2 Paid advertisements.

10.6.2.2.6.3 Public Area Information Displays.

10.6.2.2.6.4 Emails to customers.

10.6.2.2.6.5 Public meetings.

10.6.2.2.6.6 Household deliveries.

10.6.2.2.6.7 Targeted individual customer contact.

10.6.2.2.6.8 Direct material distribution to all multi-family homes and institutions.

10.6.2.2.6.9 Other methods approved by the Division.

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

10.6.2.3 As long as a community water system exceeds the action level, it must repeat the activities pursuant to subsection 10.6.2.2 as described in subsections 10.6.2.3.1 through 10.6.2.3.4.

10.6.2.3.1 A community water system shall repeat the tasks contained in subsections 10.6.2.2.1, 10.6.2.2.2 and 10.6.2.2.6 every 12 months.

10.6.2.3.2 A community water system shall repeat the tasks contained in subsection 10.6.2.2.3 with every billing cycle.

10.6.2.3.3 A community water system serving a population greater than 100,000 shall post and retain material on a publicly accessible website pursuant to subsection 10.6.2.2.4.

10.6.2.3.4 The community water system shall repeat the task in subsection 10.6.2.2.5 twice every 12 months on a schedule agreed upon with the Division. The Division can allow activities in subsection 10.6.2.2 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 Division in advance of the 60-day deadline.

10.6.2.4 Within 60 days after the end of the monitoring period in which the exceedance occurred (unless it already is repeating public education tasks pursuant to subsection 10.6.2.5), a non-transient non-community water system shall deliver the public education materials specified by subsection 10.6.1 as follows:

10.6.2.4.1 Post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the system; and

10.6.2.4.2 Distribute informational pamphlets and/or brochures on lead in drinking water to each person served by the non-transient non-community water system. The Division may allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as it achieves at least the same coverage.

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

10.6.2.5 A non-transient non-community water system shall repeat the tasks contained in subsection 10.6.2.4 at least once during each calendar year in which the system exceeds the lead action level. The Division can allow activities in subsection 10.6.2.**[2.5~~2~~4]** to extend beyond the 60-day requirement if needed for implementation purposes on a case-by-case basis; however, this extension must be approved in writing by the Division in advance of the 60-day deadline.

10.6.2.6 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 subsection 10.7. Such a system shall recommence public education in accordance with this section if it subsequently exceeds the lead action level during any monitoring period.

10.6.2.7 A community water system may apply to the Division, in writing (unless the Division has waived the requirement for prior Division approval), to use only the text specified in subsection 10.6.1.1 in lieu of the text in subsections 10.6.1.1 and 10.6.1.2 and to perform the tasks listed in **[sub]**sections 10.6.2.4 and 10.6.2.5 in lieu of the tasks listed in subsections 10.6.2.2 and 10.6.2.3 if:

10.6.2.7.1 The system is a facility, such as a prison or a hospital, where the population served is not capable of or is prevented from making improvements to plumbing or installing point of use treatment devices; and,

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

10.6.2.8 A community water system serving 3,300 or fewer people may limit certain aspects of their public education programs as follows:

10.6.2.8.1 With respect to the requirements of **[sub]**section 10.6.2.2.6, a system serving 3,300 or fewer people must implement at least one of activities listed in that section.

10.6.2.8.2 With respect to the requirements of **[sub]**section 10.6.2.2.2, a system serving 3,300 or fewer people may limit the distribution of the public education materials required under that section to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children.

10.6.2.8.3 With respect to the requirements of **[sub]**section 10.6.2.2.5, the Division may waive this requirement for systems serving 3,300 or fewer people as long as the system distributes notices to every household served by the system.

10.6.3 Supplemental monitoring and notification of results. A water system that fails to meet the lead action level on the basis of tap samples collected in accordance with section 10.7 shall offer to sample the tap water of any customer who requests it. The system is not required to pay for collecting or analyzing the sample, nor is the system required to collect and analyze the sample itself.

10.6.4 Notification of results.

10.6.4.1 Reporting requirement. All water systems must provide a notice of the individual tap results from the lead tap water monitoring carried out under the requirements of 107 to the persons served by the water system at the specific sample site from which the sample was taken (e.g., the occupants of the residence where the tap was tested).

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

10.6.4.3 Content. The consumer notice must include the results of the lead tap water monitoring for the tap that was tested, an explanation of the health effects of lead, list steps consumers can take to reduce exposure to lead in drinking water and contact information for the water utility. The notice must also provide the maximum contaminant level goal and the action level for lead and the definitions for those terms from **[sub]**section **[~~4.3.~~6.]**3.3.

10.6.4.4 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 Division. For example, upon approval by the Division, 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.

10.7 Monitoring Requirements for Lead and Copper in Tap Water:

10.7.1 Sample Site Location:

10.7.1.1 By the applicable date for commencement of monitoring under **[sub]**section 10.7.4.1, each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of this section, and which is sufficiently large enough to ensure that the water system can collect the number of lead and copper tap samples required in **[sub]**section 10.7.3. All sites from which first draw samples are collected shall be selected from this pool of targeted sampling sites. Sampling sites may not include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants.

10.7.1.2 A water system shall use the information on lead, copper, and galvanized steel that is required to collect under **[sub]**section **[~~7.2.4~~ 11.1.4]** of these regulations (special monitoring for corrosivity characteristics) when conducting a materials evaluation. When an evaluation of the information collected pursuant to **[sub]**section **[~~7.2.4~~ 11.1.4]** is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in **[sub]**section 10.7.1, the water system shall review the sources of information listed below in order to identify a sufficient number of sampling sites. In addition, the system shall seek to collect such information where possible in the course of its normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities):

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

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

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

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

10.7.1.3.1 Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

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

10.7.1.4 Any community water system with insufficient tier 1 sampling sites shall complete its sampling pool with “tier 2 sampling sites”, consisting of buildings, including multiple-family residences that:

10.7.1.4.1 Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

10.7.1.4.2 are served by a lead service line.

10.7.1.5 Any community water system with insufficient tier 1 and tier 2 sampling sites shall complete its sampling pool with “tier 3 sampling sites”, consisting of single family structures that contain copper pipes with lead solder installed before 1983. A community water system with insufficient tier 1, tier 2, and tier 3 sampling sites shall complete its sampling pool with representative sites throughout the distribution system. For the purpose of this paragraph, a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the system.

10.7.1.6 The sampling sites selected for a non-transient non-community water system (“tier 1 sampling sites”) shall consist of buildings that:

10.7.1.6.1 Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

10.7.1.6.2 Are served by a lead service line.

10.7.1.7 A non-transient non-community water system with insufficient tier 1 sites that meet the targeting criteria in **[sub]**section 10.7.1.6 shall complete its sampling pool with tier 2 sampling sites that contain copper pipes with lead solder installed before 1983. If additional sites are needed to complete the sampling pool, the non-transient non-community water system shall use representative sites throughout the distribution system. For the purpose of this paragraph, a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

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

10.7.2 Sample Collection Methods:

10.7.2.1 All tap samples for lead and copper collected in accordance with this section, with the exception of lead service line samples collected under **[sub]**section 10.5.3 and samples collected under **[sub]**section 10.7.2.5, shall be first draw samples.

10.7.2.2 Each first-draw tap sample for lead and copper shall be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least six hours. First-draw samples from residential housing shall be collected from the cold-water kitchen tap or bathroom sink tap. First-draw samples from a non-residential building shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. Non-first-draw samples collected in lieu of first-draw samples pursuant to **[sub]**section 10.7.2.5 shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. First-draw samples may be collected by the system or the system may allow residents to collect first-draw samples after instructing the residents of the sampling procedures specified in this paragraph. To avoid problems of residents handling nitric acid, acidification of first-draw samples may be done up to 14 days after the sample is collected. After acidification to resolubilize the metals, the sample must stand in the original container for the time specified in the approved EPA method before the sample can be analyzed. If a system allows residents to perform sampling, the system may not challenge, based on the alleged errors in sample collection, the accuracy of sampling results.

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

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

10.7.2.3.2 Tapping directly into the lead service line; or

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

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

10.7.2.5 A non-transient non-community water system, or a community water system that meets the criteria of **[sub]**section 10.6.2.7 that does not have enough taps that can supply first-draw samples as defined in **[sub]**section 10.7.2.2, may apply to the Division in writing to substitute non-first-draw samples. Such systems must collect as many first-draw samples from appropriate taps as possible and identify sampling times and locations that would likely result in the longest standing time for the remaining sites. The Division has the discretion to waive the requirement for prior Division approval of non-first-draw sample sites selected by the system, either through regulation or written notification to the system.

10.7.2.6 Invalidation of lead and copper tap samples. A sample invalidated under this paragraph does not count toward determining lead or copper 90th percentile levels under **[sub]**section **[~~10.1.1~~ 10.1.3.3]** or toward the minimum monitoring requirements of **[sub]**section 10.7.3.

10.7.2.6.1 The Division may invalidate a lead or copper tap sample at least if one of the following conditions is met.

10.7.2.6.1.1 The laboratory establishes that improper sample analysis caused erroneous results.

10.7.2.6.1.2 The Division determines that the sample was taken from a site that did not meet the site selection criteria of this section.

10.7.2.6.1.3 The sample container was damaged in transit.

10.7.2.6.1.4 There is substantial reason to believe that the sample was subject to tampering.

10.7.2.6.2 The system must report the results of all samples to the Division and all supporting documentation for samples the systems believes should be invalidated.

10.7.2.6.3 To invalidate a sample under **[sub]**section 10.7.2.6.1 the decision and the rationale for the decision must be documented in writing. The Division may not invalidate a sample solely on the grounds that a follow-up sample result is higher or lower than that of the original sample.

10.7.2.6.4 The system must collect replacement samples for any samples invalidated under this section if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements of **[sub]**section 10.7.3. Any such replacement samples must be taken as soon as possible, but no later than 20 days after the date the Division invalidates the sample or by the end of the applicable monitoring period, whichever occurs later. Replacement samples taken after the end of the applicable monitoring period shall not also be used to meet the monitoring requirements of a subsequent monitoring period. The replacement samples shall be taken at the same locations as the invalidated samples or, if that is not possible, at locations other than those already used for sampling during the monitoring period.

10.7.3 Number of Samples: Water systems shall collect at least one sample during each monitoring period specified in **[sub]**section 10.7.4 from the number of sites listed in the second column below ("standard monitoring"). A system conducting reduced monitoring under **[sub]**section 10.7.4.4 shall collect one sample from the number of sites specified in the third column ("reduced monitoring") below during each monitoring period specified in **[sub]**section 10.7.4.4. Such reduced monitoring sites shall be representative of the sites required for standard monitoring. A public water system that has fewer than five drinking water taps, that can be used for human consumption meeting the sample site criteria of **[sub]**section 10.7.1 to reach the required number of sample sites listed in **[sub]**section 10.7.3, must collect at least one sample from each tap and then must collect additional samples from those taps on different days during the monitoring period to meet the required number of sites. Alternatively the Division may allow these public water systems to collect a number of samples less than the number of sites specified in **[sub]**section 10.7.3, provided that 100 percent of all taps that can be used for human consumption are sampled. The Division must approve this reduction of the minimum number of samples in writing based on a request from the system or onsite verification by the Division. The Division may specify sampling locations when a system is conducting reduced monitoring. The table is as follows:

System Size (No. people served)	No. of sites (Standard monitoring)	No. of sites (Reduced monitoring)
>100,000	100	50

10,001-100,000	60	30
3,301-10,000	40	20
501-3,300	20	10
101-500	10	5
<100	5	5

10.7.4 Timing of Monitoring:

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

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

10.7.4.1.1 All large systems shall monitor during two consecutive six-month periods.

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

10.7.4.1.2.1 The system exceeds the lead or copper action level and is therefore required to implement the corrosion control treatment requirements under subsection 10.2 in which case the system shall continue monitoring in accordance with subsection 10.7.4.2, or

10.7.4.1.2.2 The system meets the lead and copper action levels during two consecutive six-month monitoring periods, in which case the system may reduce monitoring in accordance with subsection 10.7.4.4.

10.7.4.2 Monitoring after Installation of Corrosion Control and Source Water Treatment:

10.7.4.2.1 Any large system which installs optimal corrosion control treatment pursuant to subsection 10.2.4 Step 4 shall monitor during two consecutive six-month periods by the date specified in subsection 10.2.4 Step 5.

10.7.4.2.2 Any small or medium-size system which installs optimal corrosion control treatment pursuant to subsection 10.2.5 Step 5 shall monitor during two consecutive six-month periods by the date specified in subsection 10.2.5 Step 6.

10.7.4.2.3 Any system which installs source water treatment pursuant to subsection 10.4.1 Step 3 shall monitor during two consecutive six-month periods by the date specified in subsection 10.4.1 Step 4.

10.7.4.3 Monitoring after Division specifies Water Quality Parameter Values for Optimal Corrosion Control: After the Division specifies the values for water quality control parameters under subsection 10.3.6, the system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the Division specifies the optimal values under subsection 10.3.6.

10.7.4.4 Reduced Monitoring:

10.7.4.4.1 A small or medium-size water system that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with subsection 10.7.3, and reduce the frequency of sampling to once per year. A small or medium water system collecting fewer than five samples as specified in subsection 10.7.3, that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the frequency of sampling to once per year. In no case can the system reduce the number of samples required below the minimum of one sample per available tap. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

10.7.4.4.2 Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Division under subsection 10.3.6 during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring to once per year and to reduce the number of lead and copper samples in accordance with subsection 10.7.3 if it receives written approval from

the Division. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period. The Division shall review monitoring, treatment and other relevant information submitted by the water system in accordance with subsection 10.10, and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring pursuant to this paragraph. The Division 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.

10.7.4.4.3 A small or medium-size water system that meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years. Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Division under subsection 10.3.6 during three consecutive years of monitoring may reduce the frequency of monitoring from annually to once every three years if it receives written approval from the Division. Samples collected once every three years shall be collected no later than every third calendar year. The Division shall review monitoring, treatment and other relevant information submitted by the water system in accordance with subsection 10.10 and shall notify the system in writing when it determines the system is eligible to reduce the frequency of monitoring to once every three years. The Division 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.

10.7.4.4.4 A water system that reduces the number and frequency of sampling shall collect these samples from sites included in the pool of targeted sampling sites identified in subsection 10.7.1. Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August or September unless the Division has approved a different sampling period in accordance with subsection 10.7.4.4.4.1.

10.7.4.4.4.1 The Division, at its discretion, may approve a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. Such a period shall be no longer than four consecutive months and must represent a time of normal operation where the highest levels of lead are most likely to occur. For a non-transient non-community water system that does not operate during the months of June through September, and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, The Division shall designate a period that represents a time of normal operation for the system. This sampling shall begin during the period approved or designated by the Division in the calendar year immediately following the end of the second consecutive six-month monitoring period for systems initiating annual monitoring and during the three-year period following the end of the third consecutive calendar year of annual monitoring for systems initiating triennial monitoring.

10.7.4.4.4.2 Systems monitoring annually, that have been collecting samples during the months of June through September and that receive Division approval to alter their sample collection period under subsection 10.7.4.4.4.1, must collect their next round of samples during a time period that ends no later than 21 months after the previous round of sampling. Systems monitoring triennially that have been collecting samples during the months of June through September, and receive Division approval to alter the sampling collection period as per subsection 10.7.4.4.4.1, must collect their next round of samples during a time period that ends no later than 45 months after the previous round of sampling. Subsequent rounds of sampling must be collected annually or triennially, as required by this subsection. Small systems with waivers, granted pursuant to subsection 10.7.6, that have been collecting samples during the months of June through September and receive Division approval to alter their sample collection period under subsection 10.7.4.4.4.1 must collect their next round of samples before the end of the 9-year period.

10.7.4.4.5 Any water system that demonstrates for two consecutive 6-month monitoring periods that the tap water lead level computed under subsection 10.1.**[~~1~~13]**.3 is less than or equal to 0.005 mg/L and the tap water copper level computed under subsection 10.1.**[~~1~~13]**.3 is less than or equal to 0.65 mg/L may reduce the number of samples in accordance with subsection 10.7.3 and reduce the frequency of sampling to once every three calendar years.

10.7.4.4.6 Return to standard monitoring after failure to meet action levels or operate within specified water quality parameters.

10.7.4.4.6.1 A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action levels shall resume sampling in accordance with subsection **[~~10.7.4.4.3~~ 10.1.3.3]** and collect the number of samples specified for standard monitoring under subsection 10.7.3. Such a system shall also conduct water quality parameter monitoring in accordance with subsection**[s]** 10.8.2, 10.8.3 or 10.8.4 (as appropriate) during the monitoring period in which it exceeded the action level. Any such system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in subsection 10.7.3 after it has completed two subsequent consecutive 6-month rounds of monitoring that meet the requirements of subsection 10.7.4.4.1 and/or may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either subsection 10.7.4.**[4.]**3 or 10.7.4.4.5.

10.7.4.4.6.2 Any water system subject to reduced monitoring frequency that fails to meet the lead action level during any four-month monitoring period or that fails to operate at or above the minimum value or within the range of values for the water quality control parameters specified by the Division under subsection 10.3.6 for more than nine days in any 6-month period specified in subsection 10.8.4 shall conduct tap water sampling for lead and copper at the frequency specified in subsection 10.7.4.3, collect the number of samples specified for standard monitoring under subsection 10.7.3, and shall resume monitoring for water quality parameters within the distribution system in accordance with subsection 10.8.4. This standard tap water sampling shall begin no later than the six-month period beginning January 1 of the calendar year following the lead action level exceedance or water quality parameter excursion. 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:

10.7.4.4.6.2.1 The system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in subsection 10.7.3 after it has completed two subsequent 6-month rounds of monitoring that meet the criteria of subsection 10.7.4.4.2 and the system has received written approval from the Division that it is appropriate to resume reduced monitoring on the annual frequency. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

10.7.4.4.6.2.2 The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either subsections 10.7.4.4.3 or 10.7.4.4.5 and the system has received written approval from the Division that it is appropriate to resume triennial monitoring.

10.7.4.4.6.2.3 The system may reduce the number of water quality parameter tap water samples required in accordance with subsection 10.8.5.1 and the frequency with which it collects such samples in accordance with subsection 10.8.5.2. Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of subsection 10.8.5.2, that it has re-qualified for triennial monitoring.

10.7.4.4.7 Any water system subject to a reduced monitoring frequency under subsection 10.7.4.4 shall notify the Division in writing in accordance with subsection 10.10.1.3 of any upcoming long-term change in treatment or addition of a new source as described in that section. The Division must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Division may require the system to resume sampling in accordance with subsection 10.7.4.3 and collect the number of samples specified for standard monitoring under subsection 10.7.3 or take other appropriate steps such as increased water quality parameter monitoring or re-evaluation of its corrosion control treatment given the potentially different water quality considerations.

10.7.5 Additional Monitoring by Systems: The results of any monitoring conducted in addition to the minimum requirements of this subsection shall be considered by the system and the Division in making any determinations (i.e., calculating the 90th percentile lead or copper level) under this section.

10.7.6 Monitoring Waivers for Small Systems: Any small system that meets the criteria of this paragraph may apply to the Division to reduce the frequency of monitoring for lead and copper under this section to once every nine years (i.e., a “full waiver”) if it meets all of the materials criteria specified in section 10.7.6.1 and all of the monitoring criteria specified in **[sub]**section 10.7.6.2. If Division regulations permit, any small system that meets the criteria in subsections 10.7.6.1 and 10.7.6.2 only for lead, or only for copper, may

apply to the Division for a waiver to reduce the frequency of tap water monitoring to once every nine years for that contaminant only (i.e., a “partial waiver”).

10.7.6.1 Materials Criteria: The system must demonstrate that its distribution system and service lines and all drinking water supply plumbing, including plumbing conveying drinking water within all residences and buildings connected to the system, are free of lead-containing materials and/or copper-containing materials, as those terms are defined in this paragraph, as follows:

10.7.6.1.1 Lead. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for lead (i.e., a “lead waiver”), the water system must provide certification and supporting documentation to the Division that the system is free of all lead-containing materials as follows:

10.7.6.1.1.1 It contains no plastic pipe which contain lead plasticizers, or plastic service lines which contain lead plasticizers; and

10.7.6.1.1.2 It is free of lead service lines, lead pipes, lead soldered pipe joints, and leaded brass or bronze alloy fittings and fixtures, unless such fittings and fixtures meet the specifications of any standard established pursuant to 42 U.S.C. 300g-6(e) (Safe Drinking Water Act section 1417(e)).

10.7.6.1.2 Copper. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for copper (i.e., a “copper waiver”), the water system must provide certification and supporting documentation to the Division that the system contains no copper pipes or copper service lines.

10.7.6.2 Monitoring Criteria for Waiver Issuance: The system must have completed at least one six-month round of standard tap water monitoring for lead and copper at sites approved by the Division and from the number of sites required by subsection 10.7.3 and demonstrate that the 90th percentile levels for any and all rounds of monitoring conducted since the system became free of all lead-containing and/or copper-containing materials, as appropriate, meet the following criteria.

10.7.6.2.1 Lead levels. To qualify for a full waiver, or a lead waiver, the system must demonstrate that the 90th percentile lead level does not exceed 0.005 mg/L.

10.7.6.2.2 Copper levels. To qualify for a full waiver, or a copper waiver, the system must demonstrate that the 90th percentile copper level does not exceed 0.65 mg/L.

10.7.6.3 Division Approval of Waiver Application: The Division shall notify the system of its waiver determination, in writing, setting forth the basis of its decision and any condition of the waiver. As a condition of the waiver, the Division may require the system to perform specific activities (e.g., limited monitoring, periodic outreach to customers to remind them to avoid installation of materials that void the waiver) to avoid the risk of lead or copper concentration of concern in tap water. The small system must continue monitoring for lead and copper at the tap as required by subsections 10.7.4.1 through 10.7.4.4, as appropriate, until it receives written notification from the Division that the waiver has been approved.

10.7.6.4 Monitoring frequency for systems with waivers.

10.7.6.4.1 A system with a full waiver must conduct tap water monitoring for lead and copper in accordance with subsection 10.7.4.4.4 at the reduced number of sampling sites identified in subsection 10.7.3 at least once every nine years and provide the materials certification specified in subsection 10.7.6.1 for both lead and copper to the Division along with the monitoring results. Samples collected every nine years shall be collected no later than every ninth calendar year.

10.7.6.4.2 A system with a partial waiver must conduct tap water monitoring for the waived contaminant in accordance with subsection 10.4.4.4 at the reduced number of sample sites specified in subsection 10.7.3 at least once every nine years and provide the materials certification specified in subsection 10.7.6.1 pertaining to the waived contaminant along with the monitoring results. Such a system also must continue to monitor for the non-waived contaminant in accordance with subsections 10.7.4.1 through 10.7.4.4, as appropriate.

10.7.6.4.3 Any water system with a full or partial waiver shall notify the Division in writing in accordance with subsection 10.10.1.3 of any upcoming long-term change in treatment or addition of a new source, as described in that subsection. The Division must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The Division has the authority to require the system to modify waiver conditions (e.g., require re-certification that the system is free of lead-containing and/or copper-containing materials or require additional round(s) of monitoring), if it deems such modifications are necessary to address treatment or source water changes at the system.

10.7.6.4.4 If a system with a full or partial waiver becomes aware that it is no longer free of lead-containing or copper-containing materials, as appropriate, (e.g., as a result of new construction or repairs), the system shall notify the Division in writing no later than 60 days after becoming aware of such a change.

10.7.6.5 Continued Eligibility: If the system continues to satisfy the requirements of subsection 10.7.6.4, the waiver will be renewed automatically, unless any of the conditions listed in subsections 10.7.6.5.1 through 10.7.6.5.3 occurs. A system whose waiver has been revoked may re-apply for a waiver at such time as it again meets the appropriate materials and monitoring criteria of subsections 10.7.6.1 and 10.7.6.2.

10.7.6.5.1 A system with a full waiver or a lead waiver no longer satisfies the materials criteria of subsection 10.7.6.1.1 or has a 90th percentile level greater than 0.005 mg/L.

10.7.6.5.2 A system with a full waiver or a copper waiver no longer satisfies the materials criteria of subsection 10.7.6.1.2 or has a 90th percentile copper level greater than 0.65 mg/L.

10.7.6.5.3 The Division notifies the system, in writing, that the waiver has been revoked, setting forth the basis of its decision.

10.7.6.6 Requirements Following Waiver Revocation: A system whose full or partial waiver has been revoked by the Division is subject to the corrosion control treatment and lead and copper tap water monitoring requirements, as follows:

10.7.6.6.1 If the system exceeds the lead and/or copper action level, the system must implement corrosion control treatment in accordance with the deadlines specified in subsection 10.2.5, and any other applicable requirements of this subsection.

10.7.6.6.2 If the system meets both the lead and copper action level, the system must monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sample sites specified in subsection 10.7.3.

10.7.6.7 Pre-existing Waivers: Small system waivers approved by the Division in writing prior to April 11, 2000 shall remain in effect under the following conditions:

10.7.6.7.1 If the system has demonstrated that it is both free of lead-containing and copper-containing materials, as required by subsection 10.7.6.1 and that its 90th percentile lead levels and 90th percentile copper levels meet the criteria of subsection 10.7.6.2, the waiver remains in effect so long as the system continues to meet the waiver eligibility criteria of subsection 10.7.6.5. The first round of tap monitoring conducted pursuant to subsection 10.7.6.4 shall be completed no later than nine years after the last time the system has monitored for lead and copper at the tap.

10.7.6.7.2 If the system has met the materials criteria of subsection 10.7.6.1 but has not met the monitoring criteria of subsection 10.7.6.2, the system shall conduct a round of monitoring for lead and copper at the tap demonstrating that it meets the criteria of subsection 10.7.6.2, no later than September 30, 2003. Thereafter, the waiver shall remain in effect as long as the system meets the continued eligibility criteria of subsection 10.7.6.5. The first round of tap water monitoring conducted pursuant to subsection 10.7.6.4 shall be completed no later than nine years after the round of monitoring conducted pursuant to subsection 10.7.6.2.

10.8 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 this subsection. The requirements of this section are summarized in the table at the end of this section.

10.8.1 General Requirements:

10.8.1.1 Sample Collection Methods:

10.8.1.1.1 Tap samples shall be representative of water quality throughout the distribution system taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Tap sampling under this section is not required to be conducted at taps targeted for lead and copper sampling under subsection 10.7.1. (NOTE: Systems may find it convenient to conduct tap sampling for water quality parameters at sites used for coliform sampling under Section 5.0.)

10.8.1.1.2 Samples collected at the entry point(s) to the distribution system shall be from locations representative of each source after treatment. If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

10.8.1.2 Number of Samples:

10.8.1.2.1 Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under subsections 10.8.2 and 10.8.5 from the following number of sites:

System Size (No. people served)	No. sites for water quality parameters
>100,000	25
10,001-100,000	10
3,301-10,000	3
501-3,300	2
101-500	1
<100	1

10.8.1.2.2 Except as provided in subsection 10.8.3.3, systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in subsection 10.8.2. During each monitoring period specified in subsections 10.8.3 through 10.8.5, systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.

10.8.2 Initial Sampling: All large water systems shall measure the applicable water quality parameters as specified below at taps and at each entry point to the distribution system during each six-month monitoring period specified in subsection 10.7.4.1. All small and medium-size systems shall measure the applicable water quality parameters at the locations specified below during each six-month monitoring period specified in subsection 10.7.4.1 during which the system exceeds the lead or copper action levels.

10.8.2.1 At taps:

pH;

Alkalinity;

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

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

Calcium;

Conductivity; and

Water Temperature.

10.8.2.2 At each entry point to the distribution system, all of the applicable parameters listed in subsection 10.8.2.1.

10.8.3 Monitoring after Installation of Corrosion Control: Any large system which installs optimal corrosion control treatment pursuant to subsection 10.2.4 Step 4 shall measure the water quality parameters at the locations and frequencies specified below during each six-month monitoring period specified in subsection 10.7.4.2.1. Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each six-month monitoring period specified in subsection 10.7.4.2.2 in which the system exceeds the lead or copper action level.

10.8.3.1 At taps two samples for:

pH;

Alkalinity;

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

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

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

10.8.3.2 Except as provided in subsection 10.8.3.3 at each entry point to the distribution system, one sample every two weeks (bi-weekly) for:

pH;

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

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

10.8.3.3 Any groundwater system can limit entry point sampling described in subsection 10.8.3.2 to those entry points that are representative of water quality and treatment conditions throughout the system. If water from untreated groundwater sources mixes with water from treated groundwater sources, the system must monitor for water quality parameters both at representative entry points receiving treatment and representative points receiving no treatment. Prior to the start of any monitoring under this paragraph, the system shall provide to the Division written information identifying the selected entry points and documentation, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

10.8.4 Monitoring after Division Specifies Water Quality Parameter Values for Optimal Corrosion Control: After the Division specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under subsection 10.3.6, all large systems shall measure the applicable water quality parameters in accordance with subsection 10.8.3 and determine compliance with the requirements of subsection 10.3.7 every six months with the first six-month period to begin on either January 1 or July 1, whichever comes first, after the Division specifies the optimal values under subsection 10.3.6. Any small or medium-size system shall conduct such monitoring during each six-month period specified in this paragraph in which the system exceeds the lead or copper action level. For any such small and medium-size system that is subject to a reduced monitoring frequency pursuant to subsection 10.7.4.4 at the time of the action level exceedance, the start of the applicable six-month period under this paragraph shall coincide with the start of the applicable monitoring period under subsection 10.7.4.4. Compliance with the Division-designated optimal water quality parameter values shall be determined as specified under subsection 10.3.7.

10.8.5 Reduced Monitoring:

10.8.5.1 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 subsection 10.8.4 shall continue monitoring at the entry point(s) to the distribution system as specified in subsection 10.8.3.2. 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. people served)	Reduced no. of sites for water quality parameters
>100,000	10
10,001-100,000	7
3,301-10,000	3
501-3,300	2
101-500	1
<100	1

10.8.5.2 Frequency of monitoring

10.8.5.2.1 Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Division under subsection 10.3.6 during three consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in subsection 10.8.5.1 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 Division under subsection 10.3.6, during three consecutive years of annual monitoring under this paragraph may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in subsection 10.8.5.1 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.

10.8.5.2.2 A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in subsection 10.8.5.1 to every three years if it demonstrates during two consecutive monitoring periods that its tap water lead level at the

90th percentile is less than or equal to the PQL (Practical Quantitation Level) for lead specified in subsection 10.12, that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L for copper in subsection 10.1.3.2, and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Division under subsection 10.3.6. Monitoring conducted every three years shall be done no later than every third calendar year.

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

10.8.5.4 Any water system subject to reduced monitoring frequency that fails to operate within the range of values for the water quality parameters specified by the Division under subsection 10.3.6 for more than nine days in any six-month period specified in subsection 10.3.7 shall resume distribution system tap water sampling in accordance with the number and frequency requirements in subsection 10.8.4. Such a system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites specified in subsection 10.8.5.1 after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of that section and/or may resume triennial monitoring for water quality parameters at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either subsections 10.8.5.2.1 or 10.8.5.2.2.

10.8.6 Additional Monitoring by Systems: The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the Division in making any determinations (i.e., determining concentrations of water quality parameters) under this section or subsection 10.3.

Summary of monitoring requirements for water quality parameters[1]

Monitoring	Parameters[2]	Location	Frequency
Initial monitoring	pH, alkalinity, orthophosphate or silica[3], calcium, conductivity, temperature	Taps and at entry point(s) to the distribution system.	Every 6 months.
After installation of corrosion control	pH, alkalinity, orthophosphate or silica[3], calcium4. pH, alkalinity, dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5].	Taps Entry point(s) to the distribution system[6].	Every 6 months. No less frequently than every two weeks.
After the Division specifies parameter values for optimal corrosion control.	pH, alkalinity, orthophosphate or silica[3], calcium[4]. pH, alkalinity, dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5].	Taps Entry point(s) to the distribution system[6].	Every 6 months. No less frequently than every two weeks.
Reduced monitoring	pH, alkalinity, orthophosphate or silica[3], calcium[4]. pH, alkalinity, dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5].	Taps Entry point(s) to the distribution system[6].	Every 6 months, annually[7] or every 3 years[8]; at reduced number of sites. No less frequently than every two weeks.

[1] Table is for **[~~illustrated~~ illustrative]** purposes; consult the text of this section for precise regulatory requirements.

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

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

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

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

[6] Groundwater 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 6 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 Division under subsection **[~~10.8~~ 10.3.6]** as representing optimal corrosion control during two consecutive six-month monitoring periods.

10.9 Monitoring Requirements for Lead and Copper in Source Water:

10.9.1 Sample Location Collection Methods, and Number of samples:

10.9.1.1 A water system that fails to meet the lead or copper action level on the basis of tap samples collected in accordance with subsection 10.7 shall collect lead and copper source water samples in accordance with the requirements regarding sample location, number of samples, and collection methods:

10.9.1.1.1 Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). The system shall take one sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

10.9.1.1.2 Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment (hereafter called a sampling point). The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. NOTE: For the purpose of this paragraph, surface water systems include systems with a combination of surface and groundwater sources.

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

10.9.1.1.4 The Division may reduce the total number of samples which must be analyzed by allowing the use of compositing. Compositing of samples must be done by certified laboratory personnel. Composite samples from a maximum of five samples are allowed, provided that if the lead concentration in the composite sample is greater than or equal to 0.001 mg/L or the copper concentration is greater than or equal to 0.160 mg/L, then either:

10.9.1.1.4.1 A follow-up sample shall be taken and analyzed within 14 days at each sampling point included in the composite; or

10.9.1.1.4.2 If duplicates of or sufficient quantities from the original samples from each sampling point used in the composite are available, the system may use these instead of resampling.

10.9.1.2 Where the results of sampling indicate an exceedance of maximum permissible source water levels established under subsection 10.4.2.4, the Division may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point. If a Division-required confirmation sample is taken for lead or copper, then the results of the initial and confirmation sample shall be averaged in determining compliance with the Division-specified maximum permissible levels. Any sample value below the detection

limit shall be considered to be zero. Any value above the detection limit but below the PQL shall either be considered as the measure value or be considered one-half the PQL.

10.9.2 Monitoring Frequency after System Exceeds Tap Water Action Level: Any system which exceeds the lead or copper action level at the tap shall collect one source water sample from each entry point to the distribution system within six months after the end of the monitoring period during which the lead or copper action level was exceeded. For monitoring periods that are annual or less frequent, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or if the Division has established an alternate monitoring period, the last day of that period.

10.9.3 Monitoring Frequency after Installation of Source Water Treatment: Any system which installs source water treatment pursuant to subsection 10.4.1 Step 3 shall collect an additional source water sample from each entry point to the distribution system during two consecutive six-month monitoring periods by the deadline specified in subsection 10.4.1 Step 4.

10.9.4 Monitoring Frequency after Division Specifies Maximum Permissible Source Water Levels or Determines that Source Water Treatment is not Needed:

10.9.4.1 A system shall monitor at the frequency specified below in cases where the Division specifies maximum permissible source water levels under subsection 10.4.2.4 or determines that the system is not required to install source water treatment under subsection 10.4.2.2.

10.9.4.1.1 A water system using only groundwater shall collect samples once during the three-year compliance period (as that term is defined in section 1.0) in effect when the applicable Division determination under section 10.9.4.1 is made. Such systems shall collect samples once during each subsequent compliance period. Triennial samples shall be collected every third calendar year.

10.9.4.1.2 A water system using surface water (or a combination of surface and groundwater) shall collect samples once during each calendar year, the first annual monitoring period to begin during the year in which the applicable Division determination is made under subsection 10.9.4.1.

10.9.4.2 A system is not required to conduct source water sampling for lead and/or copper if the system meets the action level for the specific contaminant in tap water samples during the entire source water sampling period applicable to the system under subsection 10.9.4.1.1 or 10.9.4.1.2.

10.9.5 Reduced Monitoring Frequency:

10.9.5.1 A water system using only groundwater may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle (as that term is defined in section 1.0) provided that the samples are collected no later than every ninth calendar year and if the system meets one of the following criteria:

10.9.5.1.1 The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Division in subsection 10.4.2.4 during at least three consecutive compliance periods under subsection 10.9.4.1; or

10.9.5.1.2 The Division has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive compliance periods in which sampling was conducted under subsection 10.9.4.1, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

10.9.5.2 A water system using surface water (or a combination of surface and ground water) may reduce the monitoring frequency in subsection 10.9.4.1 to once during each nine-year compliance cycle (as that term is defined in section 1.0) provided that the samples are collected no later than every ninth calendar year and if the system meets one of the following criteria:

10.9.5.2.1 The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Division in subsection 10.4.2.4 during at least three consecutive years; or

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

[10.9.5.3 A water system that uses a new source of water is not eligible for reduced monitoring for lead and/or copper until concentrations in samples collected from the new source during

three consecutive monitoring periods are below the maximum permissible lead and copper concentrations specified by the Division in subsection 10.4.1 Step 5.]

10.10 Reporting Requirements: All water systems shall report all of the following information to the Division in accordance with this section.

10.10.1 Reporting Requirements for Tap Water Monitoring for Lead and Copper and for Water Quality Parameter Monitoring:

10.10.1.1 Except as provided in subsection 10.10.1.1.8, a water system shall report the information specified below for all tap water samples specified in 10.7 and for all water quality parameter samples specified in **[subsection]** 10.8 within the first 10 days following the end of each applicable monitoring period specified in subsections 10.7, and 10.8, (i.e., every six-months, annually, every 3 years or every 9 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 the period specified in subsections 10.7 and 10.8.

10.10.1.1.1 The results of all tap samples for lead and copper including the location of each site and the criteria under subsections 10.7.1.3, 10.7.1.4, 10.7.1.5, 10.7.1.6 or 10.7.1.7 under which the site was selected for the system's sampling pool;

10.10.1.1.2 Documentation for each tap water lead or copper sample for which the water system requests invalidation pursuant to subsection **[~~10.7.2.6~~ 10.7.6.2]**;

10.10.1.1.3 Reserved

10.10.1.1.4 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 subsection 10.1.1.3) unless the Division calculates the 90th percentile lead and copper levels under subsection 10.10.8;

10.10.1.1.5 With the exception of initial tap sampling conducted pursuant to subsection 10.7.4.1 the system shall designate any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;

10.10.1.1.6 The results of all tap samples for pH, and where applicable, alkalinity, calcium, conductivity, temperature, and orthophosphate or silica collected under subsections 10.8.2 through 10.8.5.

10.10.1.1.7 The results of all samples collected at the entry point(s) to the distribution system for applicable water quality parameters under subsections 10.8.2 through 10.8.5.

10.10.1.1.8 A water system shall report the results of all water quality parameter samples collected under subsections 10.8.3 through 10.8.6 during each six-month monitoring period specified in subsection 10.8.4 within the first ten days following the end of the monitoring period unless the Division has specified a more frequent reporting requirement.

10.10.1.2 For a non-transient non-community water system, or a community water system meeting the criteria of subsection 10.6.2.7, that does not have enough taps that can provide first-draw samples, the system must either:

10.10.1.2.1 Provide written documentation to the Division identifying standing times and locations for enough non-first-draw samples to make up its sampling pool under subsection 10.7.2.5 by the start of the first applicable monitoring period under subsection 10.7.4 that commences after April 11, 2000, unless the Division has waived prior Division approval of non-first-draw sample sites selected by the system pursuant to subsection 10.7.2.5; or

10.10.1.2.2 If the Division has waived prior approval of non-first-draw sample sites selected by the system, identify, in writing, each site that did not meet the six-hour minimum standing time and the length of standing time for that particular substitute sample collected pursuant to subsection 10.7.2.5 and include this information with the lead and copper tap sample results required to be submitted pursuant to subsection 10.10.1.1.1.

10.10.1.3 At a time specified by the Division, or if no specific time is designated by the Division, then as early as possible prior to the addition of a new source or any long-term change in water treatment, a water system deemed to have optimized corrosion control under subsection 10.2.2.3, a water system subject to reduced monitoring pursuant to subsection 10.7.4.4, or a water system subject to a monitoring waiver pursuant to subsection 10.7.7, shall submit written documentation to the Division describing the change or addition. The Division must review and approve the addition of the new source or long-term change in treatment before it is implemented by the water system. Examples of long-term treatment changes include the addition of a new treatment process or modification of an existing treatment process. Examples of modifications include switching secondary disinfectants, switching coagulants (e.g.,**[~~orthophosphate to blended phosphate)~~**

alum to ferric chloride), switching corrosion inhibitor products (e.g., alum to ferric chloride).] Long-term changes can include dose changes to existing chemicals if the system is planning long-term changes to its finished pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily raw water quality changes.

10.10.1.4 Any small system applying for a monitoring waiver under subsection 10.7.6, or subject to a waiver granted pursuant to subsection 10.7.6.3, shall provide the following information to the Division in writing by the specified deadline:

10.10.1.4.1 By the start of the first applicable monitoring period in subsection 10.7.4, any small water system applying for a monitoring waiver shall provide the documentation required to demonstrate that it meets the waiver criteria of subsections 10.7.6.1 and 10.7.6.2.

10.10.1.4.2 No later than nine years after the monitoring previously conducted pursuant to subsection 10.7.6.2 or subsection 10.7.6.4.1, each small system desiring to maintain its monitoring waiver shall provide the information required by subsections 10.7.6.4.1 and 10.7.6.4.2.

10.10.1.4.3 No later than 60 days after it becomes aware that it is no longer free of lead-containing and/or copper-containing material, as appropriate, each small system with a monitoring waiver shall provide written notification to the Division, setting forth the circumstances resulting in the lead-containing and/or copper-containing materials being introduced into the system and what corrective action, if any, the system plans to remove these materials.

10.10.1.4.4 By October 10, 2003, any small system with a waiver granted prior to April 11, 2000 and that has not previously met the requirements of subsection 10.7.6.2 shall provide the information required by that section.

10.10.1.5 Each groundwater system that limits water quality parameter monitoring to a subset of entry points under subsection 10.8.3.3 shall provide, by the commencement of such monitoring, written correspondence to the Division that identifies the selected entry points and includes the information sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

10.10.2 Source Water Monitoring Reporting Requirements:

10.10.2.1 A water system shall report the sampling results for all source water samples collected in accordance with subsection 10.9 within the first 10 days following the end of each source water monitoring period (i.e., annually, per compliance period, per compliance cycle) specified in subsection 10.9.

10.10.2.2 With the exception of the first round of source water sampling conducted pursuant to subsection 10.9.2, the system shall specify any site which was not sampled during previous monitoring periods, and include an explanation of why the sampling point has changed.

10.10.3 Corrosion Control Treatment Reporting Requirements: By the applicable dates under subsection 10.2, systems shall report the following information:

10.10.3.1 for systems demonstrating that they have already optimized corrosion control, information required in subsections 10.2.2.2 or 10.2.2.3.

10.10.3.2 for systems required to optimize corrosion control, their recommendation regarding optimal corrosion control treatment under subsections 10.3.1.

10.10.3.3 for systems required to evaluate the effectiveness of corrosion control treatments under subsection 10.3.3, the information required by that paragraph.

10.10.3.4 for systems required to install optimal corrosion control designated by the Division under subsection 10.3.4, a letter certifying that the system has completed installing that treatment.

10.10.4 Source Water Treatment Reporting Requirements: By the applicable dates in subsections 10.4, systems shall provide the following information to the Division:

10.10.4.1 if required under subsection 10.4.2.1 their recommendation regarding source water treatment;

10.10.4.2 for systems required to install source water treatment under subsection 10.4.2.2, a letter certifying that the system has completed installing the treatment designated by the Division within 24 months after the Division designated the treatment.

10.10.5 Lead Service Line Replacement Reporting Requirements: Systems shall report the following information to the Division to demonstrate compliance with the requirements of subsection 10.5:

10.10.5.1 No later than 12 months after the end of the monitoring period in which a system exceeds the lead action level in sampling referred to in subsection 10.5.1, the system must submit written documentation to the Division of the material evaluation conducted as required in subsection 10.7.1, identify the initial number of lead service lines in its distribution system at the time the

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

10.10.5.2 No later than 12 months after the end of the monitoring period in which a system exceeds the lead action level in sampling referred to in subsection 10.5.1, and every 12 months thereafter, the system shall demonstrate to the Division in writing that the system has either:

10.10.5.2.1 Replaced in the previous 12 months at least 7 percent of the initial lead service lines (or a greater number of lines specified by the Division under subsection 10.5.5 in its distribution system; or

10.10.5.2.2 Conducted sampling which demonstrates that the lead concentration in all service lines samples from an individual line(s), taken pursuant to subsection 10.7.2.3, is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced and/or which meet the criteria in subsection 10.5.3 shall equal at least 7 percent of the initial number of lead lines identified under subsection 10.10.5.1 (or the percentage specified by the Division under subsection 10.5.5.

10.10.5.3 The annual letter submitted to the Division under subsection 10.10.5.2 shall contain the following information:

10.10.5.3.1 the number of lead service lines scheduled to be replaced during the previous year of the system's replacement schedule;

10.10.5.3.2 the number and location of each lead service line replaced during the previous year of the system's replacement schedule;

10.10.5.3.3 if measured, the water lead concentration and location of each lead service line sampled, the sampling method, and the date of sampling.

10.10.5.4 Any system which collects lead service line samples following partial lead service line replacement required by subsection 10.5 shall report the results to the Division within the first ten days of the month following the month in which the system receives the laboratory results, or as specified by the Division. The Division, at its discretion may eliminate this requirement to report these monitoring results. Systems shall also report any additional information as specified by the Division, and in a time and manner prescribed by the Division, to verify that all partial lead service line replacement activities have taken place.

10.10.6 Public Education Program Reporting Requirements:

10.10.6.1 Any water system that is subject to the public education requirements in subsection 10.6 shall, within ten days after the end of each period in which the system is required to perform public education tasks in accordance with subsection 10.6.2, send written documentation to the Division that contains:

10.10.6.1.1 A demonstration that the system has delivered the public education materials that meet the content requirements in subsection 10.6.1 and the delivery requirements in subsection 10.6.2; and

10.10.6.1.2 A list of all newspapers, radio stations, television stations, and facilities and organizations to which the system delivered public education materials during the period in which the system was required to perform public education tasks.

10.10.6.2 Unless required by the Division, a system that previously has submitted the information required in subsection 10.10.6.1.2 need not resubmit the information required by subsection 10.10.6.1.2, as long as there have been no changes in the distribution list and the system certifies that the public education materials were distributed to the same list submitted previously.

10.10.6.3 No later than 3 months following the end of the monitoring period, each system must mail a sample copy of the consumer notification of tap results to the Division along with a certification that the notification has been distributed in a manner consistent with the requirements of subsection 10.6.4.

10.10.7 Reporting of Additional Monitoring Data: Any system which collects sampling data in addition to that required by this section shall report the results to the Division within the first ten days following the end of the applicable monitoring period under subsections 10.7, 10.8 and 10.9 during which the samples are collected.

10.10.8 Reporting of the 90th percentile lead and copper concentrations where the Division 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 subsection 10.10.1.1.4 if:

10.10.8.1 The Division has previously notified the water system that it will calculate the water system's 90th percentile lead and copper concentrations, based on the lead and copper tap results submitted pursuant to subsection 10.10.8.2.1, and has specified a date before the end of the applicable monitoring period by which the system must provide the results of lead and copper tap water samples;

10.10.8.2 The system has provided the following information to the Division by the date specified in subsection 10.10.8.1:

10.10.8.2.1 The results of all tap samples for lead and copper including the location of each site and the criteria under subsections 10.7.1.3, 10.7.1.4, 10.7.1.5, 10.7.1.6 and/or 10.7.1.7 under which the site was selected for the system's sampling pool, pursuant to subsection 10.10.1.1.1; and

10.10.8.2.2 An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation why sampling sites have changed; and

10.10.8.3 The Division has provided the results of the 90th percentile lead and copper calculations, in writing, to the water system before the end of the monitoring period.

10.11 Recordkeeping Requirements: Any system subject to the requirements of this section shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, Division determinations, and any other information required by subsections 10.2 through 10.9. Each water system shall retain the records required by this section for no fewer than 12 years.

10.12 Analytical Methodology: Analysis for compliance with this section shall be conducted in accordance with 40 CFR 141.89. Copies may be obtained from the Office of Drinking Water.

11.0 Corrosivity

11.1 Corrosivity Sampling, Reporting and Analytical Methodology: Suppliers of water for community public water systems shall collect samples from a representative entry point to the water distribution system for the purpose of analyses to determine the corrosivity characteristics of the water.

11.1.1 Sampling Requirements: For water suppliers utilizing surface water wholly or in part, two (2) samples per plant are required, one (1) during mid-winter and one (1) during mid-summer. For water suppliers utilizing wholly ground water sources, one (1) sample per plant per year shall be required.

11.1.1.1 The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may be considered one (1) treatment plant for determining the minimum number of samples.

11.1.1.2 Determination of the corrosivity characteristics of the water shall include measurement of pH, calcium hardness, alkalinity, temperature, total dissolved solids (total filterable residue) and the calculation of the Langelier Index (LI) in accordance with subsection 11.1.3.1. The determination of corrosivity characteristics shall only include one (1) round of sampling (two (2) samples per plant for surface water and one sample per plant for ground water sources). However, the Division may require addition or more frequent monitoring as appropriate. In addition, the Division has the discretion to require monitoring for additional parameters which may indicate corrosivity characteristics such as sulfates and chlorides. In certain cases, the Aggressive Index (AI) as described in subsection 11.1.3.2 can be used instead of the LI. The Division will make this determination. Waters exhibiting a LI of less than -2.0 or an AI of less than 10.0 shall be considered highly corrosive/aggressive.

11.1.2 Reporting to the Division: The supplier of water shall report to the Division the results of the analyses for corrosivity characteristics pursuant to subsection 4.1.1.

11.1.3 Analytical Methodology: Analyses conducted to determine the corrosivity of the water shall be made in accordance with the following methods:

11.1.3.1 Langelier Index -- "Standard Methods for the Examination of Water and Wastewater," 19th Edition, Method 203.

11.1.3.2 Aggressive Index -- "AWWA Standard for Asbestos-Cement Pipe, 4 in. through 24 in. for Water Other Liquids," AWWA C400-77, Revision of C400-75, AWWA, Denver, Colorado.

11.1.3.3 Total Filterable Residue -- "Standard Methods for the Examination of Water and Wastewater," 19th Edition, Method 208B, or "Methods of Chemical Analysis of Water and Wastes," Method 160.1.

11.1.3.4 Temperature, Calcium, Alkalinity, and pH -- in accordance with 40 CFR 141.23(k)(1). Copies may be obtained from the Office of Drinking Water.

11.1.3.5 Chloride and Sulfate – in accordance with 40 CFR 143.4. Copies may be obtained from the Office of Drinking Water.

11.1.3.6 Any alternate analytical technique approved by the Division.

11.1.4 Reporting of Construction Materials: PWSs shall identify whether the following construction materials are present in their distribution system and report to the Division:

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

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

11.1.4.3 Galvanized piping, service lines and home plumbing.

11.1.4.4 Ferrous piping materials such as cast iron and steel.

11.1.4.5 Asbestos cement pipe.

11.1.4.6 Vinyl lined asbestos cement pipe.

11.1.4.7 Coal tar lined pipes and tanks.

11.1.4.8 In addition, the Division may require identification and reporting of other materials of construction present in distribution systems that may contribute contaminants to the drinking water.

12.0 Disinfectant Residuals, Disinfection Byproducts, and Disinfection Precursors:

12.1 General requirements: The requirements of this section constitute national primary drinking water regulations.

12.1.1 The regulations in this section establish criteria under which community water systems (CWSs) and non-transient, non-community water systems (NTNCWSs) which add a chemical disinfectant to the water in any part of the drinking water treatment process must modify their practices to meet MCLs and MRDLs in subsections 9.2.1.2 and 1.19.3 respectively, and must meet the treatment technique requirements for disinfection byproduct precursors in subsection 12.9.

12.1.2 The regulations in this section establish criteria under which transient NCWSs that use chlorine dioxide as a disinfectant or oxidant must modify their practices to meet the MRDL for chlorine dioxide in subsection **[~~8.3~~ 1.19.3]**.

12.1.3 EPA has established MCLs for TTHM and HAA5 and treatment technique requirements for disinfection byproduct precursors to limit the levels of known and unknown disinfection byproducts which may have adverse health effects. These disinfection byproducts may include chloroform; bromodichloromethane; dibromochloromethane; bromoform; dichloroacetic acid; and trichloroacetic acid.

12.2 Compliance Dates

12.2.1 CWSs and NTNCWSs. Unless otherwise noted, systems must comply with the requirements of this section as follows. Surface water or ground water under the direct influence of surface water systems serving 10,000 or more persons must comply with this section beginning December 16, 2001. Surface water or ground water under the direct influence of surface water systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this section beginning December 16, 2003. All systems must comply with these MCLs until the date specified in subsection **[~~13.1.3~~ 14.1.3]**.

12.2.2 Transient NCWSs. Surface water or ground water under the direct influence of surface water systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide and chlorite in this section beginning December 16, 2001. Surface water or ground water under the direct influence of surface water systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide and chlorite in this section beginning December 16, 2003.

12.3 Each CWS and NTNCWS regulated under subsection 12.1 must be operated by qualified personnel who meet the requirements specified by the Division and are included in a State register of qualified operators.

12.4 Control of disinfectant residuals. Notwithstanding the MRDLs in subsection 1.19.3, systems may increase residual disinfectant levels in the distribution system of chlorine or chloramines (but not chlorine dioxide) to a level and for a time necessary to protect public health, to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm run-off events, source water contamination events, or cross-connection events.

12.5 For compliance with this section systems must use analytical methods in accordance with 40 CFR 141.131(a); 40 CFR 141.131(b)(1-2); 40 CFR 141.131(c)(1-2); and 40 CFR 141.131(d)(1-6. Copies may be obtained from the Office of Drinking Water.

12.5.1 Analysis under this section for disinfection byproducts must be conducted by laboratories that have received certification by EPA or the Division, except as specified under subsection 12.7.2.1.3. To receive certification to conduct analysis for the contaminants in subsection 9.2.1.2, the laboratory must carry out annual analyses of performance evaluation (PE) samples approved by EPA or the Division. In the analyses of PE samples, the laboratory must achieve quantitative results within the acceptance limit **[~~on all of the analytes included in each PE sample. The acceptance limit is defined as the 95% confidence interval calculated around the mean of the PE study data between a maximum and a minimum acceptance limit of+/-50% and +/-15% of the study mean~~ as specified in 40 CFR 141.131(b)(2)(i)]**.

12.5.2 A party approved by the EPA or the Division must measure residual disinfectant concentration.

12.6 Monitoring requirements – General requirements:

12.6.1 Systems must take all samples during normal operating conditions.

12.6.2 Systems may consider multiple wells drawing from a single aquifer as one treatment plant for determining the minimum of TTHM and HAA5 samples required, with the approval of the Division **[~~in accordance with criteria developed under subsection 9.2.2.2.1~~]**.

12.6.3 Failure to monitor in accordance with the monitoring plan required under subsection 12.11 is a monitoring violation.

12.6.4 Failure to monitor will be treated as a violation for the entire period covered by the annual average where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MCLs or MRDLs.

12.6.5 Systems may use only data collected under the provisions of this section or 61 FR 24368, May 14, 1996 to qualify for reduced monitoring.

12.7 Monitoring requirements for disinfection byproducts:

12.7.1 TTHM and HAA5

12.7.1.1 Routine monitoring. Systems must monitor at the frequency indicated in the following table:

Type of system	Minimum monitoring frequency	Sample location in the distribution system
Surface water or ground water under the direct influence of surface water system serving at least 10,000 persons	Four water samples per quarter per treatment plant	At least 25% of all samples collected each quarter at locations representing maximum residence time. Remaining samples taken at locations representative of at least average residence time in the distribution system and representing the entire distribution system, taking into account number of persons served, different sources of water, and different treatment methods.[1]
Surface water or ground water under the direct influence of surface water systems serving from 500 to 9,999 persons	One water sample per quarter per treatment plant	Locations representing maximum residence time.[1]
Surface water or ground water under the direct influence of surface water system serving fewer than 500 persons	One sample per year per treatment plant during month of warmest water temperature	Location representing maximum residence time[1]. If the sample (or average of annual samples, if more than one sample is taken) exceeds MCL, system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until system meets reduced monitoring criteria in subsection 12.7.1.4.

Systems using only groundwater not under the direct influence of surface water using chemical disinfectant and serving at least 10,000 persons.	One sample per quarter per treatment plant.[2]	Locations representing maximum residence time.[1]
Systems using only groundwater not under the direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons.	One sample per year per treatment plant2 during the month of warmest water temperature.	Locations representing maximum residence time.[1] If the sample (or average of annual samples, if more than one sample is taken) exceeds MCL, system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until system meets reduced monitoring criteria in subsection 12.7.1.2.

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

[2] Multiple wells drawing from a single aquifer may be considered one treatment plant for determining the minimum number of samples required, with Division approval **[~~in accordance with criteria developed under subsection 9.2.2.2.1~~]**.

12.7.1.2 Reduced monitoring. Systems may reduce monitoring, except as otherwise provided, in accordance with the following table:

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

Note: Any Surface water or ground water under the direct influence of surface water system serving fewer than 500 persons may not reduce its monitoring to less than one sample per treatment plant per year.

12.7.1.3 Monitoring requirements for source water TOC. In order to qualify for reduced monitoring for TTHM and HAA5 under subsection 12.7.1.2, surface water or ground water under the direct influence of surface water systems not monitoring under the provisions of subsection 12.9.1 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 Division. In addition to meeting the other criteria for reduced monitoring in subsection 12.7.1.2, 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 subsection 12.7.1.2, a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to treatment.

12.7.1.4 Systems on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year (for systems which must monitor quarterly) or the result of the sample (for systems which must monitor no more frequently than annually) is no more than 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively. Systems that do not meet these levels must resume monitoring at the frequency identified in subsection 12.7.1.1 in the quarter immediately following the quarter in which the system exceeds 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively. For systems using only groundwater not under the direct influence of surface water and serving fewer than 10,000 persons, if either the TTHM annual average is >0.080 mg/L or the HAA5 annual average is >0.060 mg/L, the system must go to increased monitoring identified in subsection 12.7.1.1 (sample location column) in the quarter immediately following the monitoring period in which the system exceeds 0.080 mg/L or 0.060 mg/L for TTHMs or HAA5s respectively.

12.7.1.5 Systems on increased monitoring may return to routine monitoring if, after at least one year of monitoring their TTHM annual average is <0.060 mg/L and their HAA5 annual average is <0.045 mg/L.

12.7.1.6 The Division may return a system to routine monitoring at the Division's discretion.

12.7.2 Chlorite. Community and non-transient non-community water systems using chlorine dioxide, for disinfection or oxidation, must conduct monitoring for chlorite.

12.7.2.1 Routine monitoring

12.7.2.1.1 Daily monitoring. Systems must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the system must take additional samples in the distribution system the following day at the locations required by subsection 12.7.2.2, in addition to the sample required at the entrance to the distribution system.

12.7.2.1.2 Monthly monitoring. Systems must take a three-sample set each month in the distribution system. The system must take one sample at each of the following locations: near the first customer, at a location representative of average residence time, and at a location reflecting maximum residence time in the distribution system. Any additional routine sampling must be conducted in the same manner (as three-sample sets, at the specified locations). The system may use the results of additional monitoring conducted under subsection 12.7.2.2 to meet the requirement for monitoring in this paragraph.

12.7.2.1.3 A party approved by EPA or the Division must measure daily chlorite samples at the entrance to the distribution system.

12.7.2.2 Additional monitoring. On each day following a routine sample monitoring result that exceeds the chlorite MCL at the entrance to the distribution system, the system is required to take three chlorite distribution system samples at the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

12.7.2.3 Reduced monitoring.

12.7.2.3.1 Chlorite monitoring at the entrance to the distribution system required by subsection 12.7.2.1.1 may not be reduced.

12.7.2.3.2 Chlorite monitoring in the distribution system required by subsection 12.7.2.1.2 may be reduced to one three-sample set per quarter after one year of monitoring where no individual chlorite sample taken in the distribution system under subsection 12.7.2.1.2 has exceeded the chlorite MCL and the system has not been required to conduct monitoring under subsection 12.7.2.2. The system may remain on the reduced monitoring schedule until either any of the three individual chlorite samples taken quarterly in the distribution system under subsection

12.7.2.1.2 exceeds the chlorite MCL or the system is required to conduct monitoring under subsection 12.7.2.2, at which time the system must revert to routine monitoring.

12.7.3 Bromate.

12.7.3.1 Routine monitoring. Community and non-transient non-community systems using ozone, for disinfection or oxidation, must take one sample per month for each treatment plant in the system using ozone. Systems must take samples monthly at the entrance to the distribution system while the ozonation system is operating under normal conditions.

12.7.3.2 Reduced monitoring.

12.7.3.2.1 Until March 31, 2009, systems required to analyze for bromate may reduce monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly bromide measurements for one year. The system may remain on reduced bromate monitoring until the running annual average source water bromide concentration, computed quarterly, is equal to or greater than 0.05 mg/L based upon representative monthly measurements. If the running annual average source water bromide concentration is ≥0.05 mg/L, the system must resume routine monitoring required by subsection 12.7.3.1.

12.7.3.2.2 Beginning April 1, 2009, systems may no longer use the provisions of subsection 12.7.3.2.1 to qualify for reduced monitoring. A system required to analyze for bromate may reduce monitoring from monthly to quarterly, if the system running annual average bromate concentration is ≤0.0025 mg/L based on monthly bromate measurements under subsection 12.7.3.1 for the most recent four quarters, with samples analyzed using Method 317.0 Revision 2.0, 326.0 or 321.8. If a system has qualified for reduced bromate monitoring under subsection 12.7.3.2.1 that system may remain on reduced monitoring as long as the running annual average of quarterly bromate samples ≤0.0025 mg/L based on samples analyzed using Method 317.0 Revision 2.0, 326.0, or 321.8. If the running annual average bromate concentration is >0.0025 mg/L, the system must resume routine monitoring required by subsection 12.7.3.1.

12.8 Monitoring requirements for disinfectant residuals.

12.8.1 Chlorine and Chloramines.

12.8.1.1 Routine monitoring. Systems must measure the residual disinfectant level at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in Section 7.0. **[~~Surface water or ground water under the direct influence of surface water systems may use the results of residual disinfectant concentration sampling conducted under subsection 17.3.3, in lieu of taking separate samples.~~]**

12.8.1.2 Reduced monitoring. Monitoring may not be reduced.

12.8.2 Chlorine dioxide.

12.8.2.1 Routine monitoring. Community, non-transient non-community, and transient non-community water systems that use chlorine dioxide for disinfection or oxidation must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the system must take samples in the distribution system the following day at the locations required by subsection 12.8.2.2, in addition to the sample required at the entrance to the distribution system.

12.8.2.2 Additional monitoring. On each day following a routine sample monitoring result that exceeds the MRDL, the system is required to take three chlorine dioxide distribution system samples. If chlorine dioxide or chloramines are used to maintain a disinfectant residual in the distribution system, or if chlorine is used to maintain a disinfectant residual in the distribution system and there are no disinfection addition points after the entrance to the distribution system (i.e., no booster chlorination), the system must take three samples as close to the first customer as possible, at intervals of at least six hours. If chlorine is used to maintain a disinfectant residual in the distribution system and there are one or more disinfection addition points after the entrance to the distribution system (i.e., booster chlorination), the system must take one sample at each of the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

12.8.2.3 Reduced monitoring. Chlorine dioxide monitoring may not be reduced.

12.9 Monitoring requirements for disinfection byproduct precursors (DBPP).

12.9.1 Routine monitoring. Surface water or ground water under the direct influence of surface water systems which use conventional filtration treatment (as defined in Section 1.0) must monitor each treatment plant

for TOC no later than the point of combined filter effluent turbidity monitoring and representative of the treated water. All systems required to monitor under this paragraph must also monitor for TOC in the source water prior to any treatment at the same time as monitoring for TOC in the treated water. These samples (source water and treated water) are referred to as paired samples. At the same time as the source water sample is taken, all systems must monitor for alkalinity in the source water prior to any treatment. Systems must take one paired sample and one source water alkalinity sample per month per plant at a time representative of normal operating conditions and influent water quality.

12.9.2 Reduced monitoring. Surface water or ground water under the direct influence of surface water systems with an average treated water TOC of less than 2.0 mg/L for two consecutive years, or less than 1.0 mg/L for one year, may reduce monitoring for both TOC and alkalinity to one paired sample and one source water alkalinity sample per plant per quarter. The system must revert to routine monitoring in the month following the quarter when the annual average treated water TOC >2.0 mg/L.

12.10 Bromide: Until April 1, 2009, systems required to analyze for bromate may reduce bromate monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly measurements for one year. The system must continue bromide monitoring to remain on reduced bromate monitoring.

12.11 Monitoring plans. Each system required to monitor under this Section 12.0 must develop and implement a monitoring plan. The system must maintain the plan and make it available for inspection by the Division and the general public no later than 30 days following the applicable compliance dates in subsection 12.2. All Surface water or ground water under the direct influence of surface water systems serving more than 3300 people must submit a copy of the monitoring plan to the Division no later than the date of the first report required under subsection 12.6. The Division may also require the plan to be submitted by any other system. After review, the Division may require changes in any plan elements. The plan must include at least the following elements.

12.11.1 Specific locations and schedules for collecting samples for any parameters included in this section.

12.11.2 How the system will calculate compliance with MCLs, MRDLs, and treatment techniques.

12.11.3 If approved for monitoring as a consecutive system, or if providing water to a consecutive system, under the provisions of subsection 1.16.2, the sampling plan must reflect the entire distribution system.

12.12 Compliance requirements:

12.12.1 General requirements.

12.12.1.1 Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor for TTHM, HAA5, or bromate, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MRDLs for chlorine and chloramines, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average.

12.12.1.2 All samples taken and analyzed under the provisions of this section must be included in determining compliance, even if that number is greater than the minimum required.

12.12.1.3 If, during the first year of monitoring under Section 12.0, any individual quarter's average will cause the running annual average of that system to exceed the MCL, the system is out of compliance at the end of that quarter.

12.13 Disinfection byproducts.

12.13.1 TTHMs and HAA5s

12.13.1.1 For systems monitoring quarterly, compliance with MCLs in subsection 9.2.1.2 must be based on a running annual arithmetic average, computed quarterly, of quarterly arithmetic averages of all samples collected by the system as prescribed by subsection 12.7.1. If the running annual arithmetic average of quarterly averages covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to subsection 4.2, in addition to reporting to the Division pursuant to subsection 12.15. If a PWS fails to complete four consecutive quarters' monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.

12.13.1.2 For systems monitoring less frequently than quarterly, compliance must be based on an average of samples taken that year under the provisions of subsection 12.7.1. If the average of these samples exceeds the MCL, the system must increase monitoring to once per quarter per treatment plant and such a system is not in violation of the MCL until it has completed one year of quarterly monitoring, unless the result of fewer than four quarters of monitoring will cause the running

annual average to exceed the MCL, in which case the system is in violation at the end of that quarter. Systems required to increase monitoring frequency to quarterly monitoring must calculate compliance by including the sample that triggered the increased monitoring plus the following three quarters of monitoring.

12.13.2 Bromate. Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly samples (or, for months in which the system takes more than one sample, the average of all samples taken during the month) collected by the system as prescribed by subsection **[~~12.4.7.3~~ 12.7.3]**. If the average of samples covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to subsection 4.2, in addition to reporting to the Division pursuant to subsection 12.13. If a PWS fails to complete 12 consecutive months' monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.

12.13.3 Chlorite. Compliance must be based on an arithmetic average of each three sample set taken in the distribution system as prescribed by **sub**section**~~s~~ [~~12.4.7.2.1.1 and 12.4.7.2.2~~ 12.7.2]**. If the arithmetic average of any three sample set exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to subsection 4.2, in addition to reporting to the Division pursuant to subsection 12.15.

12.14 Disinfectant residuals.

12.14.1 Chlorine and chloramines.

12.14.1.1 Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly averages of all samples collected by the system under subsection 12.**[~~4~~48]**.8.1. If the average of quarterly averages covering any consecutive four-quarter period exceeds the MRDL, the system is in violation of the MRDL and must notify the public pursuant to section 4.2, in addition to reporting to the Division pursuant to subsection 12.15.

12.14.1.2 In cases where systems switch between the use of chlorine and chloramines for residual disinfection during the year, compliance must be determined by including together all monitoring results of both chlorine and chloramines in calculating compliance. Reports submitted pursuant to subsection 12.6 must clearly indicate which residual disinfectant was analyzed for each sample.

12.14.2 Chlorine dioxide

12.14.2.1 Acute violations. Compliance must be based on consecutive daily samples collected by the system under subsection 12.**[~~4.~~]**8.2. If any daily sample taken at the entrance to the distribution system exceeds the MRDL, and on the following day one (or more) of the three samples taken in the distribution system exceed the MRDL, the system is in violation of the MRDL and must take immediate corrective action to lower the level of chlorine dioxide below the MRDL and must notify the public pursuant to the procedures for acute health risks in subsection 4.2 in addition to reporting to the Division pursuant to subsection 12.15. Failure to take samples in the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system will also be considered an MRDL violation and the system must notify the public of the violation in accordance with the provisions for acute violations under subsection 4.2 in addition to reporting to the Division in accordance with subsection 12.15.

12.14.2.2 Non-acute violations. Compliance must be based on consecutive daily samples collected by the system under subsection 12.4.8.2. If any two consecutive daily samples taken at the entrance to the distribution system exceed the MRDL and all distribution system samples taken are below the MRDL, the system is in violation of the MRDL and must take corrective action to lower the level of chlorine dioxide below the MRDL at the point of sampling and will notify the public pursuant to the procedures for non-acute health risks in subsection 4.2 in addition to reporting to the Division pursuant to subsection 12.15. Failure to monitor at the entrance to the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also an MRDL violation and the system must notify the public of the violation in accordance with the provisions for non-acute violations under subsection 4.2 in addition to reporting to the Division in accordance with subsection 12.15.

12.14.3 Disinfection byproduct precursors (DBPP). Compliance must be determined as specified by subsection 12.16.3. Systems may begin monitoring to determine whether Step 1 TOC removals can be met 12 months prior to the compliance date for the system. This monitoring is not required and failure to monitor during this period is not a violation. However, any system that does not monitor during this period, and then determines in the first 12 months after the compliance date that it is not able to meet the Step 1 requirements in subsection 12.16.2.2 and must therefore apply for alternate minimum TOC removal (Step 2) requirements, is not eligible for retroactive approval of alternate minimum TOC removal (Step 2) requirements as allowed pursuant to subsection 12.16.2.3 and is in violation. Systems may apply for

alternate minimum TOC removal (Step 2) requirements any time after the compliance date. For systems required to meet Step 1 TOC removals, if the value calculated under subsection 12.16.3.1.4 is less than 1.00, the system is in violation of the treatment technique requirements and must notify the public pursuant to subsection 4.2, in addition to reporting to the Division pursuant to subsection 12.15.

12.15 Reporting and recordkeeping requirements:

12.15.1 Systems required to sample quarterly or more frequently must report to the Division within 10 days after the end of each quarter in which samples were collected, notwithstanding the provisions of subsections 4.1.1, 4.1.2, 4.1.3, 4.1.7 and 4.1.8. Systems required to sample less frequently than quarterly must report to the Division within 10 days after the end of each monitoring period in which samples were collected.

12.15.2 Disinfection byproducts. Systems must report the information specified in the following table:

If you are a…	You must report[1]…
System monitoring for TTHM and HAA5 under the requirements of subsection 12.**[4.]**7 on a quarterly or more frequent basis	1. The number of samples taken during the last quarter. 2. The location, date, and result of each sample taken during the last quarter. 3. The arithmetic average of all samples taken in the last quarter. 4. The annual arithmetic average of the quarterly arithmetic averages of this section for the last four quarters. 5. Whether, based on subsection 12.15.1, the MCL was violated.
System monitoring for TTHMs and HAA5 under the requirements of subsection 12.**[4.]**7 less frequently than quarterly (but at least annually).	1. The number of samples taken during the last year. 2. The location, date, and result of each sample taken during the last quarter. 3. The arithmetic average of all samples taken over the last year. 4. Whether, based on subsection 12.15.1, the MCL was violated.
System monitoring for TTHMs and HAA5 under the requirements of subsection 12.**[4.]**7 less frequently than annually.	1. The location, date, and result of the last sample taken. 2. Whether, based on subsection 12.15.1, the MCL was violated.
System monitoring for chlorite under the requirements of subsection 12.**[4.]**7.	1. The number of entry point samples taken each month for the last three months. 2. The location, date, and result of each sample taken during the last quarter. 3. For each month in the reporting period, the arithmetic average of all samples taken in the month. 4. Whether, based on subsection 12.15.3, the MCL was violated, and how many times it was violated each month.
System monitoring for bromate under the requirements of subsection 12.**[4.]**7.	1. The number of samples taken during the last quarter. 2. The location, date, and result of each sample taken during the last quarter. 3. The arithmetic average of the monthly arithmetic averages of all samples taken in the last year. 4. Whether, based on subsection 12.15.2 the MCL was violated.

[1] The Division may choose to perform calculations and determine whether the MCL was exceeded, in lieu of having the system report that information.

12.15.3 Disinfectants. Systems must report the information specified in the following table:

If you are a…	You must report[1]…

System monitoring for chlorine or chloramines under the requirements of subsection 12.**[~~4.~~]**8.	1. The number of samples taken during the month of the last quarter. 2. The monthly arithmetic average of all samples taken in each month for the last 12 months. 3. The arithmetic average of all monthly averages for the last 12 months. 4. Whether, based on subsection **[~~12.5.3.1~~ 1.19.3.1]**, the MRDL was violated.
System monitoring for chlorine dioxide under the requirements of subsection 12.**[~~4.~~]**8.	1. The dates, results, and locations of samples taken during the last quarter. 2. Whether, based on subsection **[~~12.5.3.2~~ 1.19.3.1]**, the MRDL was violated. 3. Whether the MRDL was exceeded in any two consecutive daily samples and whether the resulting violation was acute or non-acute.

[1] The Division may choose to perform calculations and determine whether the MRDL was exceeded, in lieu of having the system report that information.

12.15.4 Disinfection byproduct precursors and enhanced coagulation or enhanced softening. Systems must report the information specified in the following table:

If you are a…	You must report[1]…
System monitoring monthly or quarterly for TOC under the requirements of subsection 12.**[~~4.~~]**9 and required to meet the enhanced coagulation or enhanced softening requirements in subsections 12.16.2.2 or 12.16.2.3.	1. The number of paired (source water and treated water, prior to continuous disinfection) samples taken during the last quarter. 2. The location, date, and result of each paired sample and associated alkalinity taken during the last quarter. 3. For each month in the reporting period that paired sample were taken, the arithmetic average of the percent reduction of TOC for each paired sample and the required TOC percent removal. 4. Calculations for determining compliance with the TOC percent removal requirements, as provided in subsection 12.16.3.1. 5. Whether the system is in compliance with the enhanced coagulation or enhanced softening percent removal requirements in subsection 12.16.2 for the last four quarters.

System monitoring monthly or quarterly for TOC under the requirements of subsection 12.**[4.]**9 and meeting one or more of the alternative compliance criteria in subsections 12.16.1.2 or 12.16.1.3.	1. The alternative compliance criterion that the system is using. 2. The number of paired (source water and treated water, prior to continuous disinfection) samples taken during the last quarter. 3. The location, date, and result of each paired sample and associated alkalinity taken during the last quarter. 4. The running annual arithmetic average based on monthly averages (or quarterly samples) of source water TOC for systems meeting a criterion in subsections 12.16.1.2.1 or 12.16.1.2.3 or of treated water TOC for systems meeting the criterion in subsection 12.16.1.2.2. 5. The running annual arithmetic average based on monthly averages (or quarterly samples) of source water SUVA for systems meeting the criterion in subsection 12.7.1.2.5 or of treated water SUVA for systems meeting the criterion in subsection 12.16.1.2.6. 6. The running annual average of source water alkalinity for systems meeting the criterion in subsection 12.16.1.2.3 and of treated water alkalinity for systems meeting the criterion in subsection 12.16.1.3.1. 7. The running annual average for both TTHM and HAA5 for systems meeting the criterion in subsection 12.16.1.2.3 or 12.16.1.2.4. 8. The running annual average of the amount of magnesium hardness removal (as CaCO3, in mg/L) for systems meeting the criterion in subsection 12.16.1.3.2. 9. Whether the system is in compliance with the particular alternative compliance criterion in subsections 12.16.1.2 or 12.16.1.3.

[1] The Division may choose to perform calculations and determine whether the treatment technique was met, in lieu of having the system report the information.

12.16 Treatment Technique for Control of Disinfection Byproduct (DBP) Precursors:

12.16.1 Applicability.

12.16.1.1 Surface water or ground water under the direct influence of surface water systems using conventional filtration treatment (as defined in Section 1.0) must operate with enhanced coagulation or enhanced softening to achieve the TOC percent removal levels specified in subsection 12.16.2 unless the system meets at least one of the alternative compliance criteria listed in subsections 12.16.1.2 or 12.16.1.3.

12.16.1.2 Alternative compliance criteria for enhanced coagulation and enhanced softening systems. Surface water or ground water under the direct influence of surface water systems using conventional filtration treatment may use the alternative compliance criteria in subsections 12.16.1.2.1 through 12.16.1.2.6 to comply with this section in lieu of complying with subsection 12.16.2. Systems must still comply with monitoring requirements in **[subsection]** 12.**[4.]**9.

12.16.1.2.1 The system's source water TOC level, measured according to 40 CFR 141.131(d)(3), is less than 2.0 mg/L, calculated quarterly as a running annual average.

12.16.1.2.2 The system's treated water TOC level, measured according to 40 CFR 141.131(d)(3), is less than 2.0 mg/L, calculated quarterly as a running annual average.

12.16.1.2.3 The system's source water TOC level, measured as required by 40 CFR 141.131(d)(3), is less than 4.0 mg/L, calculated quarterly as a running annual average; the source water alkalinity, measured according to 40 CFR 141.131(d)(1), is greater than 60 mg/L (as CaCO3), calculated quarterly as a running annual average; and either the TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively; or prior to the effective date for compliance in subsection 12.**[4.]**2, the system has made a clear and irrevocable financial commitment not later than the effective date for compliance in subsection 12.**[4.]**2 to

use of technologies that will limit the levels of TTHMs and HAA5 to no more than 0.040 mg/L and 0.030 mg/L, respectively. Systems must submit evidence of a clear and irrevocable financial commitment, in addition to a schedule containing milestones and periodic progress reports for installation and operation of appropriate technologies, to the Division for approval not later than the effective date for compliance in subsection 12.**[~~4.~~]**2. These technologies must be installed and operating not later than June 16, 2005. Failure to install and operate these technologies by the date in the approved schedule will constitute a violation of National Primary Drinking Water Regulations.

12.16.1.2.4 The TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively, and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

12.16.1.2.5 The system's source water SUVA, prior to any treatment and measured monthly according to 40 CFR 141.131(d)(4), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

12.16.1.2.6 The system's finished water SUVA, measured monthly according to 40 CFR 141.131(d)(4), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

12.16.1.3 Additional alternative compliance criteria for softening systems. Systems practicing enhanced softening that cannot achieve the TOC removals required by **[subsection]** 12.16.2.2 may use the alternative compliance criteria in subsections 12.16.1.3.1 and 12.16.1.3.2 in lieu of complying with subsection 12.16.2. Systems must still comply with monitoring requirements in subsection 12.**[~~4.~~]**9.

12.16.1.3.1 Softening that results in lowering the treated water alkalinity to less than 60 mg/L (as CaCO3), measured monthly according to 40 CFR 141.131(d)(1) and calculated quarterly as a running annual average.

12.16.1.3.2 Softening that results in removing at least 10 mg/L of magnesium hardness (as CaCO3), measured monthly according to subsection **[~~12.4.5.1~~ 12.2.2]** and calculated quarterly as an annual running average.

12.16.2 Enhanced coagulation and enhanced softening performance requirements.

12.16.2.1 Systems must achieve the percent reduction of TOC specified in subsection 12.16.2.2 between the source water and the combined filter effluent, unless the Division approves a system's request for alternate minimum TOC removal (Step 2) requirements under subsection 12.16.2.3.

12.16.2.2 Required Step 1 TOC reductions, indicated in the following table, are based upon specified source water parameters measured in accordance with 40 CFR 141.131(d). Systems practicing softening are required to meet the Step 1 TOC reductions in the far-right column (Source water alkalinity >120 mg/L) for the specified source water TOC:

Step 1 Required Removal of TOC by Enhanced Coagulation and Enhanced Softening for Subpart H Systems Using Conventional Treatment[1,2]

Source Water TOC	Source water alkalinity, mg/L as CaCO[3] (in percentages)		
	0-60	>60-120	>120[3]
>2.0 –4.0	35.0	25.0	15.0
>4.0 –8.0	45.0	35.0	25.0
>8.0	50.0	40.0	30.0

[1] Systems meeting at least one of the conditions in subsections 12.16.1.2.1 through 12.16.1.2.6 are not required to operate with enhanced coagulation.

[2] Softening systems meeting one of the alternative compliance criteria in subsection 12.16.1.3 are not required to operate with enhanced softening.

[3] Systems practicing softening must meet the TOC removal requirements in this column.

12.16.2.3 Surface water or ground water under the direct influence of surface water conventional treatment systems that cannot achieve the Step 1 TOC removals required by subsection 12.16.2.2 due to water quality parameters or operational constraints must apply to the Division, within three months of failure to achieve the TOC removals required by subsection 12.16.2.2, for approval of

alternative minimum TOC (Step 2) removal requirements submitted by the system. If the Division approves the alternative minimum TOC removal (Step 2) requirements, the Division may make those requirements retroactive for the purposes of determining compliance. Until the Division approves the alternate minimum TOC removal (Step 2) requirements, the system must meet the Step 1 TOC removals contained in subsection 12.16.2.2.

12.16.2.4 Alternate minimum TOC removal (Step 2) requirements. Applications made to the Division by enhanced coagulation systems for approval of alternative minimum TOC removal (Step 2) requirements under subsection 12.16.2.3 must include, as a minimum, results of bench- or pilot-scale testing conducted under subsection 12.16.2.4.1 and used to determine the alternate enhanced coagulation level.

12.16.2.4.1 Alternate enhanced coagulation level is defined as coagulation at a coagulant dose and pH as determined by the method described in subsections 12.16.2.4.1 through 12.16.2.4.5 such that an incremental addition of 10 mg/L of alum (as aluminum) (or equivalent amount of ferric salt) results in a TOC removal of < 0.3 mg/L. The percent removal of TOC at this point on the ``TOC removal versus coagulant dose'' curve is then defined as the minimum TOC removal required for the system. Once approved by the Division, this minimum requirement supersedes the minimum TOC removal required by the table in subsection 12.16.2.2. This requirement will be effective until such time as the Division approves a new value based on the results of a new bench- and pilot-scale test. Failure to achieve Division-set alternative minimum TOC removal levels is a violation of National Primary Drinking Water Regulations.

12.16.2.4.2 Bench- or pilot-scale testing of enhanced coagulation must be conducted by using representative water samples and adding 10 mg/L increments of alum (as aluminum) (or equivalent amounts of ferric salt) until the pH is reduced to a level less than or equal to the enhanced coagulation Step 2 target pH shown in the following table:

Enhanced Coagulation Step 2 Target pH

Alkalinity (mg/L as CaCO3)	Target pH
0 – 60	5.5
>60 – 120	6.3
>120 – 240	7.0
>240	7.5

12.16.2.4.3 For waters with alkalinities of less than 60 mg/L for which addition of small amounts of alum or equivalent addition of iron coagulant drives the pH below 5.5 before significant TOC removal occurs, the system must add necessary chemicals to maintain the pH between 5.3 and 5.7 in samples until the TOC removal of 0.3 mg/L per 10 mg/L alum added (as aluminum) (or equivalent addition of iron coagulant) is reached.

12.16.2.4.4 The system may operate at any coagulant dose or pH necessary (consistent with other NPDWRs) to achieve the minimum TOC percent removal approved under subsection 12.16.2.3.

12.16.2.4.5 If the TOC removal is consistently less than 0.3 mg/L of TOC per 10 mg/L of incremental alum dose (as aluminum) at all dosages of alum (or equivalent addition of iron coagulant), the water is deemed to contain TOC not amenable to enhanced coagulation. The system may then apply to the Division for a waiver of enhanced coagulation requirements.

12.16.3 Compliance Calculations:

12.16.3.1 Surface water or ground water under the direct influence of surface water systems other than those identified in subsections 12.16.1.2 or 12.16.1.3 must comply with requirements contained in subsections 12.16.2.2 or 12.16.2.3. Systems must calculate compliance quarterly, beginning after the system has collected 12 months of data, by determining an annual average using the following method:

12.16.3.1.1 Determine actual monthly TOC removal, equal to: (1-(treated water TOC/source water TOC)) X 100.

12.16.3.1.2 Determine the required monthly TOC percent removal (from either the table in subsection 12.16.2.2 or from subsection 12.16.2.3).

12.16.3.1.3 Divide the value in subsection 12.16.3.1.1 by the value in subsection 12.16.3.1.2.

12.16.3.1.4 Add together the results of subsection 12.16.3.1.3 for the last 12 months and divide by 12.

12.16.3.1.5 If the value calculated in subsection 12.16.3.1.4 is less than 1.00, the system is not in compliance with the TOC percent removal requirements.

12.16.3.2 Systems may use the provisions in subsections 12.16.3.2.1 through 12.16.3.2.5 in lieu of the calculations in subsections 12.16.3.1.1 through 12.16.3.1.5 to determine compliance with TOC percent removal requirements.

12.16.3.2.1 In any month that the system's treated or source water TOC level, measured according to 40 CFR 141.131(d)(3), is less than 2.0 mg/L, the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 12.16.3.1.3) when calculating compliance under the provisions of subsection 12.16.3.1.

12.16.3.2.2 In any month that a system practicing softening removes at least 10 mg/L of magnesium hardness (as CaCO3), the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 12.16.3.1.3) when calculating compliance under the provisions of subsection 12.16.3.1.

12.16.3.2.3 In any month that the system's source water SUVA, prior to any treatment and measured according to 40 CFR 141.131(d)(4), is <2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 12.16.3.1.3) when calculating compliance under the provisions of subsection 12.16.3.1.

12.16.3.2.4 In any month that the system's finished water SUVA, measured according to 40 CFR 141.131(d)(4), is <2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 12.16.3.1.3) when calculating compliance under the provisions of subsection 12.16.3.1.

12.16.3.2.5 In any month that a system practicing enhanced softening lowers alkalinity below 60 mg/L (as CaCO3), the system may assign a monthly value of 1.0 (in lieu of the value calculated in subsection 12.16.3.1.3) when calculating compliance under the provisions of subsection 12.16.3.1.

12.16.3.3 Surface water or ground water under the direct influence of surface water systems using conventional treatment may also comply with the requirements of this section by meeting the criteria in subsection 12.16.1.2 or 12.16.1.3.

12.16.4 Treatment technique requirements for DBP precursors. The Division identifies the following as treatment techniques to control the level of disinfection byproduct precursors in drinking water treatment and distribution systems:

12.16.4.1 For Surface water or ground water under the direct influence of surface water systems using conventional treatment, enhanced coagulation or enhanced softening.

13.0 Initial Distribution System Evaluations

13.1 General requirements.

13.1.1 The requirements of Section 13.0 constitute national primary drinking water regulations. The regulations in this subpart establish monitoring and other requirements for identifying Section 14.0 compliance monitoring locations for determining compliance with maximum contaminant levels for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5). You must use an Initial Distribution System Evaluation (IDSE) to determine locations with representative high TTHM and HAA5 concentrations throughout your distribution system. IDSEs are used in conjunction with, but separate from, **[~~subs~~S]**ection 12.**[40]** compliance monitoring, to identify and select Section 14.0 compliance monitoring locations.

13.1.2 Applicability. You are subject to these requirements if your system is a community water system that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light; or if your system is a non-transient non-community water system that serves at least 10,000 people and uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

13.1.3 Schedule.

13.1.3.1 You must comply with the requirements of this section on the schedule in the table in this paragraph.

If you serve this population	You must submit your standard monitoring plan or system specific study plan[1] or 40/30 certification[2] to the Division by or receive very small system waiver from the Division	You must complete your standard monitoring or system specific study by	You must submit your IDSE report to the Division by[3]
Systems that are not part of a combined distribution system and systems that serve the largest population in the combined distribution system			
(i) >100,000	October 1, 2006	September 30, 2008	January 1, 2009
(ii) 50,000-99,999	April 1, 2007	March 31, 2009	July 1, 2009
(iii) 10,000-49,999	October 1, 2007	September 30, 2009	January 1, 2010
(iv) <10,000 (CWS only)	April 1, 2008	March 31, 2010	July 1, 2010
Other systems that are part of a combined distribution system			
(v) Wholesale system or consecutive system	At the same time as the system with the earliest compliance date in the combined distribution system.	At the same time as the system with the earliest compliance date in the combined distribution system.	At the same time as the system with the earliest compliance date in the combined distribution system.

[1] If, within 12 months after the date identified in this column, the Division does not approve your plan or notify you that it has not yet completed its review, you may consider the plan that you submitted as approved. You must implement that plan and you must complete standard monitoring or a system specific study no later than the date identified in the third column.

[2] You must submit your 40/30 certification under subsection 13.4 by the date indicated.

[3] If, within three months after the date identified in this column (nine months after the date identified in this column if you must comply on the schedule in section iii of the table), the Division does not approve your IDSE report or notify you that it has not yet completed its review, you may consider the report that you submitted as approved and you must implement the recommended monitoring as required in Section 14.0.

13.1.3.2 For the purpose of the schedule in **[sub]**section 13.1.3.1, the Division may determine that the combined distribution system does not include certain consecutive systems based on factors such as receiving water from a wholesale system only on an emergency basis or receiving only a small percentage and small volume of water from a wholesale system. The Division may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

13.1.4 You must conduct standard monitoring that meets the requirements in subsection 13.2, or a system specific study that meets the requirements in subsection 13.3, or certify to the Division that you meet 40/30 certification criteria under subsection 13.4, or qualify for a very small system waiver under subsection 13.5.

13.1.4.1 You must have taken the full complement of routine TTHM and HAA5 compliance samples required of a system with your population and source water under **[~~subsection 12.4~~ Section 12.0]** of this part (or you must have taken the full complement of reduced TTHM and HAA5 compliance samples required of a system with your population and source water under subsection **[~~12.4~~ 12.7.1.1]** if you meet reduced monitoring criteria under subsection **[~~12.4~~ 12.7.1.2]** of this part) during the period specified in subsection 13.4.1 to meet the 40/30 certification criteria in subsection 13.4. You must have taken TTHM and HAA5 samples under subsections **[~~12.4.5.1 and 12.4.6~~ 12.6]** to be eligible for the very small system waiver in subsection 13.5.

13.1.4.2 If you have not taken the required samples, you must conduct standard monitoring that meets the requirements in subsection 13.2, or a system specific study that meets the requirements in subsection 13.3.

13.1.5 You must use only the analytical methods specified in subsection 12.**[~~4.~~]**5.1, or otherwise approved by EPA for monitoring under this section, to demonstrate compliance with the requirements of this section.

13.1.6 IDSE results will not be used for the purpose of determining compliance with MCLs in subsection 9.2.1.2.

13.2 Standard monitoring.

13.2.1 Standard monitoring plan. Your standard monitoring plan must comply with subsections 13.2.1 through 13.2.1.4. You must prepare and submit your standard monitoring plan to the Division according to the schedule in subsection 13.1.3.

13.2.1.1 Your standard monitoring plan must include a schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating locations and dates of all projected standard monitoring, and all projected compliance monitoring in subsection 12.**[46]**.

13.2.1.2 Your standard monitoring plan must include justification of standard monitoring location selection and a summary of data you relied on to justify standard monitoring location selection.

13.2.1.3 Your standard monitoring plan must specify the population served and system type (surface water or ground water under the direct influence of surface water or ground water).

13.2.1.4 You must retain a complete copy of your standard monitoring plan submitted under subsection 13.2.1, including any Division modification of your standard monitoring plan, for as long as you are required to retain your IDSE report under subsection 13.2.3.4.

13.2.2 Standard monitoring.

13.2.2.1 You must monitor as indicated in the table in this subsection 13.2.2.1. You must collect dual sample sets at each monitoring location. One sample in the dual sample set must be analyzed for TTHM. The other sample in the dual sample set must be analyzed for HAA5. You must conduct one monitoring period during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature. You must review available compliance, study, or operational data to determine the peak historical month for TTHM or HAA5 levels or warmest water temperature.

Source Water Type	Population Size Category	Monitoring periods and frequency of sampling	Distribution system monitoring locations[1]				
			Total per monitoring period	Near entry points	Average residence time	High TTHM locations	High HAA5 locations

Surface water or ground water under the direct influence of surface water	<500 consecutive systems	One (during peak historical month)[2]	2	1	.....	1	
	<500 non-consecutive systems	.....	2	.....	.....	1	1
	500-3,300 consecutive systems	Four (every 90 days)	2	1	.....	1	
	500-3,300 non-consecutive systems	.....	2	.....	.....	1	1
	3,301-9,999	.....	4	.....	1	2	1
	10,000-49,999	Six (every 60 days)	8	1	2	3	2
	50,000-249,999	.....	16	3	4	5	4
	250,000-999,999	.....	24	4	6	8	6
	1,000,000-4,999,999	.....	32	6	8	10	8
	≥5,000,000	.....	40	8	10	12	10
Ground Water	<500 consecutive systems	One (during peak historical month)[2]	2	1	.....	1	
	<500 non-consecutive systems	.....	2	.....	.....	1	1
	500-9,999	Four (every 90 days)	2	.....	.....	1	1
	10,000-99,999	.....	6	1	1	2	2
	100,000-499,999	.....	8	1	1	3	3
	≥500,000	.....	12	2	2	4	4

[1] A dual sample set (i.e., a TTHM and an HAA5 sample) must be taken at each monitoring location during each monitoring period.

[2] The peak historical month is the month with the highest TTHM or HAA5 levels or the warmest water temperature.

13.2.2.2 You must take samples at locations other than the existing monitoring locations in subsection 12.4. Monitoring locations must be distributed throughout the distribution system.

13.2.2.3 If the number of entry points to the distribution system is fewer than the specified number of entry point monitoring locations, excess entry point samples must be replaced equally at high TTHM and HAA5 locations. If there is an odd extra location number, you must take a sample at a high TTHM location. If the number of entry points to the distribution system is more than the specified

number of entry point monitoring locations, you must take samples at entry points to the distribution system having the highest annual water flows.

13.2.2.4 Your monitoring under this subsection 13.2.2 may not be reduced under the provisions of subsection 1.16.2.

13.2.3 IDSE report. Your IDSE report must include the elements required in subsections 13.2.3.1 through 13.2.3.4. You must submit your IDSE report to the Division according to the schedule in subsection 13.1.3.

13.2.3.1 Your IDSE report must include all TTHM and HAA5 analytical results from compliance monitoring under subsection 12.**[46]** and all standard monitoring conducted during the period of the IDSE as individual analytical results and LRAAs presented in a tabular or spreadsheet format acceptable to the Division. If changed from your standard monitoring plan submitted under subsection 13.1, your report must also include a schematic of your distribution system, the population served, and system type (Surface water or ground water under the direct influence of surface water or ground water).

13.2.3.2 Your IDSE report must include an explanation of any deviations from your approved standard monitoring plan.

13.2.3.3 You must recommend and justify compliance monitoring locations and timing under Section 1**[54]**.0 based on the protocol in subsection 13.6.

13.2.3.4 You must retain a complete copy of your IDSE report submitted under this section for 10 years after the date that you submitted your report. If the Division modifies the monitoring requirements under Section 1**[54]**.0 that you recommended in your IDSE report or if the Division approves alternative monitoring locations, you must keep a copy of the Division's notification on file for 10 years after the date of the Division's notification. You must make the IDSE report and any Division notification available for review by the Division or the public.

13.3 System specific studies.

13.3.1 System specific study plan. Your system specific study plan must be based on either existing monitoring results as required under subsection 13.1.1 or modeling as required under subsection 13.1.2. You must prepare and submit your system specific study plan to the Division according to the schedule in subsection 13.1.3.

13.3.1.1 Existing monitoring results. You may comply by submitting monitoring results collected before you are required to begin monitoring under subsection 13.1.3. The monitoring results and analysis must meet the criteria in subsections 13.3.1.1.1 and 13.3.1.1.2.

13.3.1.1.1 Minimum requirements.

13.3.1.1.1.1 TTHM and HAA5 results must be based on samples collected and analyzed in accordance with subsection 12.**[4.]**5.1. Samples must be collected no earlier than five years prior to the study plan submission date.

13.3.1.1.1.2 The monitoring locations and frequency must meet the conditions identified in this subsection 13.3.1.1.1.2. Each location must be sampled once during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature for every 12 months of data submitted for that location. Monitoring results must include all compliance monitoring results under subsection 12.**[4.6]** plus additional monitoring results as necessary to meet minimum sample requirements.

System Type	Population size category	Number of monitoring locations	Number of samples	
			TTHM	HAA5

Surface water or ground water under the direct influence of surface water	<500	3	3	3
	500-3,300	3	9	9
	3,301-9,999	6	36	36
	10,000-49,999	12	72	72
	50,000-249,999	24	144	144
	250,000-999,999	36	216	216
	1,000,000-4,999,999	48	288	288
	≥5,000,000	60	360	360
Ground Water	<500	3	3	3
	500-9,999	3	9	9
	10,000-99,999	12	48	48
	100,000-499,999	18	72	72
	≥500,000	24	96	96

13.3.1.1.2 Reporting monitoring results. You must report the information in this subsection 13.3.1.1.2.

13.3.1.1.2.1 You must report previously collected monitoring results and certify that the reported monitoring results include all compliance and non-compliance results generated during the time period beginning with the first reported result and ending with the most recent results collected under subsection 12.**[46]**.

13.3.1.1.2.2 You must certify that the samples were representative of the entire distribution system and that the treatment and distribution system have not changed significantly since the samples were collected.

13.3.1.1.2.3 Your study monitoring plan must include a schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed or planned system specific study monitoring.

13.3.1.1.2.4 Your system specific study plan must specify the population served and system type (Surface water or ground water under the direct influence of surface water or ground water).

13.3.1.1.2.5 You must retain a complete copy of your system specific study plan submitted under this subsection 13.3.1.1, including any Division modification of your system specific study plan, for as long as you are required to retain your IDSE report under subsection 13.3.2.5.

13.3.1.1.2.6 If you submit previously collected data that fully meet the number of samples required under subsection 13.3.1.1.1.2 and the Division rejects some of the data, you must either conduct additional monitoring to replace rejected data on a schedule the Division approves or conduct standard monitoring under subsection 13.2.

13.3.1.2 Modeling. You may comply through analysis of an extended period simulation hydraulic model. The extended period simulation hydraulic model and analysis must meet the criteria in this subsection 13.3.1.2.

13.3.1.2.1 Minimum requirements.

13.3.1.2.1.1 The model must simulate 24 hour variation in demand and show a consistently repeating 24 hour pattern of residence time.

13.3.1.2.1.2 The model must represent the criteria listed in subsections 13.3.1.2.1.2.1 through 13.3.1.2.1.2.9.

13.3.1.2.1.2.1 75% of pipe volume;

13.3.1.2.1.2.2 50% of pipe length;

13.3.1.2.1.2.3 All pressure zones;

13.3.1.2.1.2.4 All 12-inch diameter and larger pipes;

13.3.1.2.1.2.5 All 8-inch and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps, and control valves, or are known or expected to be significant conveyors of water;

13.3.1.2.1.2.6 All 6-inch and larger pipes that connect remote areas of a distribution system to the main portion of the system;

13.3.1.2.1.2.7 All storage facilities with standard operations represented in the model; and

13.3.1.2.1.2.8 All active pump stations with controls represented in the model; and

13.3.1.2.1.2.9 All active control valves.

13.3.1.2.1.3 The model must be calibrated, or have calibration plans, for the current configuration of the distribution system during the period of high TTHM formation potential. All storage facilities must be evaluated as part of the calibration process. All required calibration must be completed no later than 12 months after plan submission.

13.3.1.2.2 Reporting modeling. Your system specific study plan must include the information in this subsection 13.3.1.2.2.

13.3.1.2.2.1 Tabular or spreadsheet data demonstrating that the model meets requirements in subsection 13.3.1.2.1.2.

13.3.1.2.2.2 A description of all calibration activities undertaken, and if calibration is complete, a graph of predicted tank levels versus measured tank levels for the storage facility with the highest residence time in each pressure zone, and a time series graph of the residence time at the longest residence time storage facility in the distribution system showing the predictions for the entire simulation period (i.e., from time zero until the time it takes to for the model to reach a consistently repeating pattern of residence time).

13.3.1.2.2.3 Model output showing preliminary 24 hour average residence time predictions throughout the distribution system.

13.3.1.2.2.4 Timing and number of samples representative of the distribution system planned for at least one monitoring period of TTHM and HAA5 dual sample monitoring at a number of locations no less than would be required for the system under standard monitoring in subsection 13.2 during the historical month of high TTHM. These samples must be taken at locations other than existing compliance monitoring locations in subsection 12.**[46]**.

13.3.1.2.2.5 Description of how all requirements will be completed no later than 12 months after you submit your system specific study plan.

13.3.1.2.2.6 Schematic of your distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed system specific study monitoring (if calibration is complete) and all compliance monitoring under subsection 12.**[46]**.

13.3.1.2.2.7 Population served and system type (Surface water or ground water under the direct influence of surface water or ground water).

13.3.1.2.2.8 You must retain a complete copy of your system specific study plan submitted under this subsection 13.3.1.2, including any Division modification of your system specific study plan, for as long as you are required to retain your IDSE report under subsection 13.3.1.2.7.

13.3.1.2.3 If you submit a model that does not fully meet the requirements under subsection 13.3.1.2, you must correct the deficiencies and respond to Division inquiries concerning the model. If you fail to correct deficiencies or respond to inquiries to the Division's satisfaction, you must conduct standard monitoring under **[subsection]** 13.2.

13.3.2 IDSE report. Your IDSE report must include the elements required in subsections 13.3.2.1 through 13.3.2.6. You must submit your IDSE report according to the schedule in subsection 13.1.3.

13.3.2.1 Your IDSE report must include all TTHM and HAA5 analytical results from compliance monitoring under subsection 12.**[46]** and all system specific study monitoring conducted during the period of the system specific study presented in a tabular or spreadsheet format acceptable to the Division. If changed from your system specific study plan submitted under paragraph (a) of this section, your IDSE report must also include a schematic of your distribution system, the population served, and system type (Surface water or ground water under the direct influence of surface water or ground water).

13.3.2.2 If you used the modeling provision under subsection 13.3.1.2, you must include final information for the elements described in subsection 13.3.1.2.2, and a 24-hour time series graph of residence time for each compliance monitoring location selected under Section 14.0.

13.3.2.3 You must recommend and justify compliance monitoring locations under Section 14.0 and timing based on the protocol in subsection 13.6.

13.3.2.4 Your IDSE report must include an explanation of any deviations from your approved system specific study plan.

13.3.2.5 Your IDSE report must include the basis (analytical and modeling results) and justification you used to select the recommended monitoring locations under section 14.0.

13.3.2.6 You may submit your IDSE report in lieu of your system specific study plan on the schedule identified in subsection 13.1.3 for submission of the system specific study plan if you believe that you have the necessary information by the time that the system specific study plan is due. If you elect this approach, your IDSE report must also include all information required under subsection 13.3.1.

13.3.2.7 You must retain a complete copy of your IDSE report submitted under this section for 10 years after the date that you submitted your IDSE report. If the Division modifies the monitoring requirements under section 14.0 that you recommended in your IDSE report or if the Division approves alternative monitoring locations, you must keep a copy of the Division's notification on file for 10 years after the date of the Division's notification. You must make the IDSE report and any Division notification available for review by the Division or the public.

13.4 40/30 certification.

13.4.1 Eligibility. You are eligible for 40/30 certification if you had no TTHM or HAA5 monitoring violations under subsection 12.**[47]** of this part and no individual sample exceeded 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 during an eight consecutive calendar quarter period beginning no earlier than the date specified in this subsection (13.4.1).

If your 40/30 certification is due	Then your eligibility for 40/30 certification is based on eight consecutive calendar quarters of compliance monitoring results under subsection 12.**[47]**beginning no earlier than[1]
(1) October 1, 2006	January 2004
(2) April 1, 2007	January 2004
(3) October 1, 2007	January 2005
(4) April 1, 2008	January 2005

[1] Unless you are on reduced monitoring under subsection 12.**[47.1.2]** of this part and were not required to monitor during the specified period. If you did not monitor during the specified period, you must base your eligibility on compliance samples taken during the 12 months preceding the specified period.

13.4.2 40/30 certification.

13.4.2.1 You must certify to your Division that every individual compliance sample taken under subsection 12.**[47.1]** of this part during the periods specified in **[sub]**section 13.4.1 were < =0.040 mg/L for TTHM and < =0.030 mg/L for HAA5, and that you have not had any TTHM or HAA5 monitoring violations during the period specified in subsection 13.4.1.

13.4.2.2 The Division may require you to submit compliance monitoring results, distribution system schematics, and/or recommended compliance monitoring under Section 14.0 locations in addition to your certification. If you fail to submit the requested information, the Division may require standard monitoring under subsection 13.2 or a system specific study under subsection 13.3.

13.4.2.3 The Division may still require standard monitoring under subsection 13.2 or a system specific study under subsection 13.3 even if you meet the criteria in subsection 13.4.1.

13.4.2.4 You must retain a complete copy of your certification submitted under this section for 10 years after the date that you submitted your certification. You must make the certification, all data upon which the certification is based, and any Division notification available for review by the Division or the public.

13.5 Very small system waivers.

13.5.1 If you serve fewer than 500 people and you have taken TTHM and HAA5 samples under subsection 12.**[47]**of this part, you are not required to comply with this section unless the Division notifies you that you

must conduct standard monitoring under subsection 13.2 or a system specific study under subsection 13.3.

13.5.2 If you have not taken TTHM and HAA5 samples under subsection 12.**[47.1]** of this part or if the Division notifies you that you must comply with this section, you must conduct standard monitoring under subsection 13.2 or a system specific study under subsection 13.3.

13.6 Compliance monitoring location recommendations.

13.6.1 Your IDSE report must include your recommendations and justification for where and during what month(s) TTHM and HAA5 monitoring for Section 14.0 of this part should be conducted. You must base your recommendations on the criteria in subsections 13.6.2 through 13.6.5.

13.6.2 You must select the number of monitoring locations specified in the table in this subsection 13.6.2. You will use these recommended locations as routine compliance monitoring locations for Section 14.0, unless the Division requires different or additional locations. You should distribute locations throughout the distribution system to the extent possible.

Source water type	Population size category	Monitoring frequency[1]	Distribution system monitoring location			
			Total per monitoring period[2]	Highest TTHM locations	Highest HAA5 locations	Existing subsection 12.**[46]** compliance locations
Surface water or ground water under the direct influence of surface water	<500	Per year	2	1	1	……
	500-3,300	Per quarter	2	1	1	
	3,301-9,999	Per quarter	2	1	1	……
	10,000-49,999	Per quarter	4	2	1	1
	50,000-249,999	Per quarter	8	3	3	2
	250,000-999,999	Per quarter	12	5	4	3
	1,000,000-4,999,999	Per quarter	16	6	6	4
	≥5,000,000	Per quarter	20	8	7	5
Ground water						
	<500	Per year	2	1	1	
	500-9,999	Per year	2	1	1	
	10,000-99,999	Per quarter	4	2	1	1
	100,000-499,999	Per quarter	6	3	2	1
	≥500,000	Per quarter	8	3	3	2

[1] All systems must monitor during month of highest DBP concentrations.

[2] Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for surface water or ground water under the direct influence of surface water systems serving 500-3,300.

[Ground water systems serving 500-9,999 on annual monitoring must take dual sample sets at each monitoring location. ~~Systems~~ All other systems] on annual monitoring and surface water or ground water under the direct influence of surface water systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. **[For systems serving fewer than 500 people, ~~Only~~ only]** one location with a dual sample set per monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location, and month**[~~, if monitored annually~~)]**.

13.6.3 You must recommend compliance monitoring locations under Section 1**[~~3~~4]**.0 based on standard monitoring results, system specific study results, and compliance monitoring results under subsection 12.4. You must follow the protocol in subsections 13.6.3.1 through 13.6.3.7. If required to monitor at more than eight locations, you must repeat the protocol as necessary. If you do not have existing compliance monitoring results from subsection 12.**[~~4~~6]** or if you do not have enough existing compliance monitoring results from subsection 12.**[~~4~~7]**, you must repeat the protocol, skipping the provisions of subsections 13.6.3.3 and 13.6.3.7 as necessary, until you have identified the required total number of monitoring locations.

13.6.3.1 Location with the highest TTHM LRAA not previously selected as a monitoring location under Section 14.0.

13.6.3.2 Location with the highest HAA5 LRAA not previously selected as a monitoring location under Section 14.0.

13.6.3.3 Existing average residence time compliance monitoring location under subsection 12.**[~~4~~7.1]** (maximum residence time compliance monitoring location for ground water systems) with the highest HAA5 LRAA not previously selected as a monitoring location under Section 14.0.

13.6.3.4 Location with the highest TTHM LRAA not previously selected as a monitoring location under Section 14.0.

13.6.3.5 Location with the highest TTHM LRAA not previously selected as a monitoring location under Section 14.0.

13.6.3.6 Location with the highest HAA5 LRAA not previously selected as a monitoring location under Section 14.0.

13.6.3.7 Existing average residence time compliance monitoring location under subsection **[~~13.4~~ 12.7.1]** (maximum residence time compliance monitoring location for ground water systems) with the highest TTHM LRAA not previously selected as a monitoring location under Section 1**[~~3~~4]**.0.

13.6.3.8 Location with the highest HAA5 LRAA not previously selected as a monitoring location under Section 14.0.

13.6.4 You may recommend locations other than those specified in subsection 13.6.3 if you include a rationale for selecting other locations. If the Division approves the alternate locations, you must monitor at these locations to determine compliance under Section 14.0 of this part.

13.6.5 Your recommended schedule must include monitoring under Section 14.0 during the peak historical month for TTHM and HAA5 concentration, unless the Division approves another month. Once you have identified the peak historical month, and if you are required to conduct routine monitoring at least quarterly, you must schedule compliance monitoring under Section 14.0 at a regular frequency of every 90 days or fewer.

14.0 Stage 2 Disinfection Byproducts Requirements

14.1 General requirements.

14.1.1 General. The requirements of Section 14.0 constitute national primary drinking water regulations. The regulations in this section establish monitoring and other requirements for achieving compliance with maximum contaminant levels based on locational running annual averages (LRAA) for total trihalomethanes (TTHM) and haloacetic acids (five)(HAA5), and for achieving compliance with maximum residual disinfectant residuals for chlorine and chloramine for certain consecutive systems.

14.1.2 Applicability. You are subject to these requirements if your system is a community water system or a non-transient non-community water system that uses a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.

14.1.3 Schedule. You must comply with the requirements in this section on the schedule in the following table based on your system type.

If you are this type of system	You must comply with 14.0 monitoring by:[1]
Systems that are not part of a combined distribution system that serve the largest population in the combined distribution system	
14.1.3.1 System serving ≥100,000	April 1, 2012
14.1.3.2 System Serving 50,000 – 99,999	October 1, 2012
14.1.3.3 System serving 10,000 – 49,999	October 1, 2013
14.1.3.4 System serving <10,000	October 1, 2013 if no Cryptosporidium monitoring is required under subsection 20.2.1.4 or October 1, 2014 if Cryptosporidium monitoring is required under subsections 20.2.1.4 or 20.2.1.6
Other systems that are part of a combined distribution system	
14.1.3.5 Consecutive system or wholesale system	At the same time as the system with the earliest compliance date in the combined distribution system.

[1] The Division may grant up to an additional 24 months for compliance with MCLs and operational evaluation levels if you require capital improvements to comply with an MCL.

14.1.3.6 Your monitoring frequency is specified in subsection 14.2.1.2.

14.1.3.6.1 If you are required to conduct quarterly monitoring, you must begin monitoring in the first full calendar quarter that includes the compliance date in the table in this subsection 14.1.3.

14.1.3.6.2 If you are required to conduct monitoring at a frequency that is less than quarterly, you must begin monitoring in the calendar month recommended in the IDSE report prepared under subsections 13.2 or 13.3 or the calendar month identified in the monitoring plan developed under subsection 14.3 no later than 12 months after the compliance date in this table.

14.1.3.7 If you are required to conduct quarterly monitoring, you must make compliance calculations at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter (or earlier if the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters). If you are required to conduct monitoring at a frequency that is less than quarterly, you must make compliance calculations beginning with the first compliance sample taken after the compliance date.

14.1.3.8 For the purpose of the schedule in this subsection 14.1.3, the Division may determine that the combined distribution system does not include certain consecutive systems based on factors such as receiving water from a wholesale system only on an emergency basis or receiving only a small percentage and small volume of water from a wholesale system. The Division may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

14.1.4 Monitoring and compliance.

14.1.4.1 Systems required to monitor quarterly. Under Section 14.0 in order to comply with MCLs in subsection 9.2.1.2, you must calculate LRAAs for TTHM and HAA5 using monitoring results collected under this section and determine that each LRAA does not exceed the MCL. If you fail to complete four consecutive quarters of monitoring, you must calculate compliance with the MCL based on the average of the available data from the most recent four quarters. If you take more than one sample per quarter at a monitoring location, you must average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

14.1.4.2 Systems required to monitor yearly or less frequently. Under Section 14.0 to determine compliance with MCLs in subsection 9.2.1.2, you must determine that each sample taken is less than the MCL. If any sample exceeds the MCL, you must comply with the requirements of subsection 1**[34]**.6. If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

14.1.5 Violation. You are in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if you fail to monitor.

14.2 Routine monitoring.

14.2.1 Monitoring.

14.2.1.1 If you submitted an IDSE report, you must begin monitoring at the locations and months you have recommended in your IDSE report submitted under subsection 13.6 following the schedule in subsection 14.1.3, unless the Division requires other locations or additional locations after its review. If you submitted a 40/30 certification under subsection 13.4 or you qualified for a very small system waiver under subsection 13.5 or you are a non-transient non-community water system serving <10,000, you must monitor at the location(s) and dates identified in your monitoring plan in subsection 12.6, updated as required by subsection 14.3.

14.2.1.2 You must monitor at no fewer than the number of locations identified in this subsection 14.2.1.2.

Source water type	Population size category	Monitoring frequency[1]	Distribution system monitoring location total per monitoring period[2]
Surface water or ground water under the direct influence of surface water:			
	<500	Per year	2
	500-3,300	Per quarter	2
	3,301-9,999	Per quarter	2
	10,000-49,999	Per quarter	4
	50,000-249,999	Per quarter	8
	250,000- 999,999	Per quarter	12
	1,000,000- 4,999,999	Per quarter	16
	≥5,000,000	Per quarter	20
Ground water:			
	<500	Per year	2
	500-9,999	Per year	2
	10,000-99,999	Per quarter	4
	100,000-499,999	Per quarter	6
	≥500,000	Per quarter	8

[1] All systems must monitor during month of highest DBP concentrations.

[2] Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for surface water or ground water under the direct influence of surface water systems serving 500-3,300. **[Ground water systems serving 500-9,999 on annual monitoring must take dual sample sets at each monitoring location. All other ~~Systems~~ systems]** on annual monitoring and surface water or ground water under the direct influence of surface water systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. **[For systems serving fewer than 500 people, ~~Only~~ only]** one location with a dual sample set per monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location (and month**[~~, if monitored annually~~)]**.

14.2.1.3 If you are an undisinfected system that begins using a disinfectant other than UV light after the dates in Section 13.0 for complying with the Initial Distribution System Evaluation requirements, you must consult with the Division to identify compliance monitoring locations for this section. You

must then develop a monitoring plan under subsection 14.3 that includes those monitoring locations.

14.2.2 Analytical methods. You must use an approved method listed in subsection 12.5.1 for TTHM and HAA5 analyses in this section. Analyses must be conducted by laboratories that have received certification by EPA or the Division as specified in subsection 12.5.1.

14.3 Monitoring plan.

14.3.1 You must develop and implement a monitoring plan to be kept on file for Division and public review. The monitoring plan must contain the elements in subsections 14.3.1.1.1 through 14.3.1.1.4 and be complete no later than the date you conduct your initial monitoring under this section.

14.3.1.1 Monitoring locations;

14.3.1.2 Monitoring dates;

14.3.1.3 Compliance calculation procedures; and

14.3.1.4 Monitoring plans for any other systems in the combined distribution system if the Division has reduced monitoring requirements under the Division authority in the **[40]** CFR section 142.16(m) (Copies available at the Office of Drinking Water upon request).

14.3.2 If you were not required to submit an IDSE report under either subsection 13.2 or subsection 13.3, and you do not have sufficient Section 12.0 monitoring locations to identify the required number of Section 14.0 compliance monitoring locations indicated in subsection 13.6.2, you must identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of compliance monitoring locations have been identified. You must also provide the rationale for identifying the locations as having high levels of TTHM or HAA5. If you have more section 12.0 monitoring locations than required for Section 14.0 compliance monitoring in subsection 13.6.2, you must identify which locations you will use for Section 14.0 compliance monitoring by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of Section 14.0 compliance monitoring locations have been identified.

14.3.3 If you are a surface water or ground water under the direct influence of surface water system serving >3,300 people, you must submit a copy of your monitoring plan to the Division prior to the date you conduct your initial monitoring under this section, unless your IDSE report submitted under Section 13.0 of this part contains all the information required by this section.

14.3.4 You may revise your monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for Division-approved reasons, after consultation with the Division regarding the need for changes and the appropriateness of changes. If you change monitoring locations, you must replace existing compliance monitoring locations with the lowest LRAA with new locations that reflect the current distribution system locations with expected high TTHM or HAA5 levels. The Division may also require modifications in your monitoring plan. If you are a surface water or ground water under the direct influence of surface water system serving >3,300 people, you must submit a copy of your modified monitoring plan to the Division prior to the date you are required to comply with the revised monitoring plan.

14.4 Reduced monitoring.

14.4.1 You may reduce monitoring to the level specified in the table in this section **[any time the LRAA is ≤0.040 mg/L for TTHM and ≤0.030 mg/l for HAA5 at]** all monitoring locations. You may only use data collected under the provisions of this Section**[, 14.0]** or Section 12.0 of this part to qualify for reduced monitoring. In addition, the source water annual average TOC level, before any treatment, must be **[≧ ≤]**4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either subsection 12.7.1.3 or subsection 12.9.

Source water type	Population size category	Monitoring frequency[1]	Distribution system monitoring location per monitoring period
Surface water or ground water under the direct influence of surface water:			
	<500	Per year	Monitoring may not be reduced

	500-3,300	Per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
	3,301-9,999	Per quarter	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	10,000-49,999	Per quarter	2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs.
	50,000-249,999	Per quarter	4 dual sample sets - at the locations with the two highest TTHM and two highest HAA5 LRAAs.
	250,000- 999,999	Per quarter	6 dual sample sets - at the locations with the three highest TTHM and three highest HAA5 LRAAs.
	1,000,000- 4,999,999	Per quarter	8 dual sample sets - at the locations with the four highest TTHM and four highest HAA5 LRAAs.
	≥5,000,000	Per quarter	10 dual sample sets - at the locations with the five highest TTHM and five highest HAA5 LRAAs.
Ground water:			
	<500	Every third year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
	500-9,999	Per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.

	10,000-99,999	Per year	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	100,000-499,999	Per quarter	2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs.
	≥500,000	Per quarter	4 dual sample sets - at the locations with the two highest TTHM and two highest HAA5 LRAAs.

[1] Systems on quarterly monitoring must take dual sample sets every 90 days.

14.4.2 You may remain on reduced monitoring as long as the TTHM LRAA ≤0.040 mg/L and the HAA5 LRAA ≤0.030 mg/L at each monitoring location (for systems with quarterly reduced monitoring) or each TTHM sample ≤0.060 mg/L and each HAA5 sample ≤0.045 mg/L (for systems with annual or less frequent monitoring). In addition, the source water annual average TOC level, before any treatment, must be ≤4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either subsections 12.7.1.3 or 12.9.

14.4.3 If the LRAA based on quarterly monitoring at any monitoring location exceeds either 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 or if the annual (or less frequent) sample at any location exceeds either 0.060 mg/L for TTHM or 0.045 mg/L for HAA5, or if the source water annual average TOC level, before any treatment, >4.0 mg/L at any treatment plant treating surface water or ground water under the direct influence of surface water, you must resume routine monitoring under subsection 14.2 or begin increased monitoring if subsection 14.6 applies.

14.4.4 The Division may return your system to routine monitoring at the Division's discretion.

14.5 Additional requirements for consecutive systems. If you are a consecutive system that does not add a disinfectant but delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light, you must comply with analytical and monitoring requirements for chlorine and chloramines in subsections 12.5.1 and 12.8.1 and the compliance requirements in subsection 12.14.3.1 beginning April 1, 2009, unless required earlier by the Division, and report monitoring results under subsection 12.15.

14.6 Conditions requiring increased monitoring.

14.6.1 If you are required to monitor at a particular location annually or less frequently than annually under subsections 14.2 or 14.4, you must increase monitoring to dual sample sets once per quarter (taken every 90 days) at all locations if a TTHM sample is >0.080 mg/L or a HAA5 sample is >0.060 mg/L at any location.

14.6.2 You are in violation of the MCL when the LRAA exceeds the section 14.0 MCLs in subsection 9.2.1.2, calculated based on four consecutive quarters of monitoring (or the LRAA calculated based on fewer than four quarters of data if the MCL would be exceeded regardless of the monitoring results of subsequent quarters). You are in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if you fail to monitor.

14.6.3 You may return to routine monitoring once you have conducted increased monitoring for at least four consecutive quarters and the LRAA for every monitoring location is <0.060 mg/L for TTHM and <0.045 mg/L for HAA5.

14.7 Operational evaluation levels.

14.7.1 You have exceeded the operational evaluation level at any monitoring location where the sum of the two previous quarters' TTHM results plus twice the current quarter's TTHM result, divided by 4 to determine an average, exceeds 0.080 mg/L, or where the sum of the two previous quarters' HAA5 results plus twice the current quarter's HAA5 result, divided by 4 to determine an average, exceeds 0.060 mg/L.

14.7.2.1 If you exceed the operational evaluation level, you must conduct an operational evaluation and submit a written report of the evaluation to the Division no later than 90 days after being notified of the analytical result that causes you to exceed the operational evaluation level. The written report must be made available to the public upon request.

14.7.2.2 Your operational evaluation must include an examination of system treatment and distribution operational practices, including storage tank operations, excess storage capacity, distribution system flushing, changes in sources or source water quality, and treatment changes or problems that may contribute to TTHM and HAA5 formation and what steps could be considered to minimize future exceedances.

14.7.2.2.1 You may request and the Division may allow you to limit the scope of your evaluation if you are able to identify the cause of the operational evaluation level exceedance.

14.7.2.2.2 Your request to limit the scope of the evaluation does not extend the schedule in subsection 14.7.2.1 for submitting the written report. The Division must approve this limited scope of evaluation in writing and you must keep that approval with the completed report.

14.8 Requirements for remaining on reduced TTHM and HAA5 monitoring based on results under section 12.0.

14.8.1 You may remain on reduced monitoring after the dates identified in subsection 14.1.3 for compliance with this section only if you qualify for a 40/30 certification under subsection 13.4 or have received a very small system waiver under subsection 13.5, plus you meet the reduced monitoring criteria in subsection 14.4.1, and you do not change or add monitoring locations from those used for compliance monitoring under Section 12.0 of this part. If your monitoring locations under this section differ from your monitoring locations under Section 12.0 of this part, you may not remain on reduced monitoring after the dates identified in subsection 14.1.3 for compliance with this section.

14.9 Requirements for remaining on increased TTHM and HAA5 monitoring based on results from Section 12.0.

14.9.1 If you were on increased monitoring under subsection 12.7.1, you must remain on increased monitoring until you qualify for a return to routine monitoring under subsection 14.6.3. You must conduct increased monitoring under subsection 14.6 at the monitoring locations in the monitoring plan developed under subsection 14.3 beginning at the date identified in subsection 14.1.3 for compliance with this section and remain on increased monitoring until you qualify for a return to routine monitoring under subsection 14.6.3.

14.10 Reporting and recordkeeping requirements.

14.10.1 Reporting.

14.10.1.1 You must report the following information for each monitoring location to the Division within 10 days of the end of any quarter in which monitoring is required:

14.10.1.1.1 Number of samples taken during the last quarter.

14.10.1.1.2 Date and results of each sample taken during the last quarter.

14.10.1.1.3 Arithmetic average of quarterly results for the last four quarters for each monitoring location (LRAA), beginning at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter. If the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters, you must report this information to the Division as part of the first report due following the compliance date or anytime thereafter that this determination is made. If you are required to conduct monitoring at a frequency that is less than quarterly, you must make compliance calculations beginning with the first compliance sample taken after the compliance date, unless you are required to conduct increased monitoring under **[sub]**section 14.6.

14.10.1.1.4 Whether, based on subsection 9.2.1.2 and this section, the MCL was violated at any monitoring location.

14.10.1.1.5 Any operational evaluation levels that were exceeded during the quarter and, if so, the location and date, and the calculated TTHM and HAA5 levels.

14.10.1.2 If you are a surface water or ground water under the direct influence of surface water system seeking to qualify for or remain on reduced TTHM/HAA5 monitoring, you must report the following source water TOC information for each treatment plant that treats surface water or ground water under the direct influence of surface water to the Division within 10 days of the end of any quarter in which monitoring is required:

14.10.1.2.1 The number of source water TOC samples taken each month during last quarter.

14.10.1.2.2 The date and result of each sample taken during last quarter.

14.10.1.2.3 The quarterly average of monthly samples taken during last quarter or the result of the quarterly sample.

14.10.1.2.4 The running annual average (RAA) of quarterly averages from the past four quarters.

14.10.1.2.5 Whether the RAA exceeded 4.0 mg/L.

14.10.1.3 The Division may choose to perform calculations and determine whether the MCL was exceeded or the system is eligible for reduced monitoring in lieu of having the system report that information

14.10.2 Recordkeeping. You must retain any Section 14.0 monitoring plans and your monitoring results under Section 14.0 as required by subsection **[~~4.4~~ 5.0]**.

15.0 Radioactivity

15.1 Limits

15.1.1 Maximum Contaminant Levels for radionuclides:

15.1.1.1 Reserved

15.1.1.2 MCL for radium-226 and -228: The MCL for combined radium-226 and radium-228 is five (5) pCi/L. The combined radium-226 and radium-228 value is determined by the addition of the results of the analysis radium-226 and the analysis for radium-228.

15.1.1.3 MCL for gross alpha particle activity (excluding radon and uranium): The MCL for gross alpha particle activity (including radium-226 but excluding radon and uranium) is fifteen (15) pCi/L.

15.1.1.4 MCL for beta particle and photon radioactivity:

15.1.1.4.1 The average annual concentration of beta particle and photon radioactivity for man-made radionuclides in drinking water must not produce an annual dose equivalent to the total body or any internal organ greater than four (4) millirems per year.

15.1.1.4.2 Except for those listed in Table A below, the concentration of man-made radionuclides causing four (4) millirems total body or organ dose equivalents must be calculated on the basis of a two (2) liters per day drinking water intake using the 168 hour data listed in "Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure," NBS (National Bureau of Standards) Handbook 69 as amended August 1963, U.S. Department of Commerce.This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 522(a) and 1 CFR part 51. Copies of this document are available from the National Technical Information Service, NTIS ADA 280 282, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-6847. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC. If two (2) or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed four (4) millirems per year.

Table A: Average Annual Concentrations Assumed to Produce a Total Body or Organ Dose of 4 Millirems/Year

Radionuclide	Critical Organ	pCi/L
Tritium	Total Body	20,000
Strontium	Bone Marrow	8

15.1.1.5 MCL for uranium: The MCL for uranium is 30 ug/L.

15.1.1.6 Compliance dates:

15.1.1.6.1 Compliance dates for the combined radium-226 and -228, gross alpha particle activity, gross beta particle and photon radioactivity, and uranium: Community water systems must comply with the MCLs listed subsections 15.1.1.2, 15.1.1.3, 15.1.1.4, and 15.1.1.5 beginning December 8, 2003 and compliance shall be determined in accordance with the requirements of subsections 15.2.1 and 15.2.4. Compliance with reporting requirements for the radionuclides Section 4.0 is required on December 8, 2003.

15.1.1.6.2 Reserved

15.1.1.7 Best Available Technologies (BATs) for radionuclides: The Administrator of the U.S. Environmental Protection Agency, pursuant to section 1412 of the Safe Drinking Water Act, hereby identifies as indicated in the following table the best technology available for achieving compliance with the MCLs for combined radium-226 and -228, uranium, gross alpha particle activity, and beta particle and photon radioactivity.

Table B: BAT for Combined Radium-226 and Radium-228, Uranium, Gross Alpha Particle Activity, and Beta Particle and Photon Radioactivity

Contaminant	BAT

Combined radium-226 and -228	Ion exchange, reverse osmosis, lime softening
Uranium	Ion exchange, reverse osmosis, lime softening, coagulation/ filtration
Gross alpha particle activity (excluding radon and uranium)	Reverse osmosis
Beta particle and photon radioactivity	Ion exchange, reverse osmosis

15.1.1.8 Small systems compliance technologies list for radionuclides.

Table C: List of Small Systems Compliance Technologies for Radionuclides and Limitations of Use

Unit Technologies	Limitations (see footnotes)	Operator Skill Level Required[1]	Raw Water Quality Range and Considerations
1. Ion Exchange (IE)	a	Intermediate	All ground waters
2. Point-of-Use (POU[2])IE	b	Basic	All ground waters
3. Reverse Osmosis (RO)	c	Advanced	Surface waters usually require pre-filtration
4. POU2 RO	b	Basic	Surface waters usually require pre-filtration
5. Lime softening	d	Advanced	All waters
6. Greensand filtration	e	Basic	
7. Co-precipitation with barium sulfate	f	Intermediate to advanced	Ground waters with suitable water quality
8. Electrodialysis/ Electrodialysis reversal		Basic to intermediate	All ground waters
9. Pre-formed hydrous manganese oxide filtration	g	Intermediate	All ground waters
10. Activated alumina	a, h	Advanced	All ground waters; competing anion concentrations may affect regeneration frequency
11. Enhanced coagulation/ filtration	i	Advanced	Can treat a wide range of water qualities

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

[2] A POU, or "point-of-use" technology, is a treatment device installed at a single tap used for the purpose of reducing contaminants in drinking water at the one tap. POU devices are typically installed at the kitchen tap.

Limitations Footnotes: Technologies for Radionuclides

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

b. When POU devices are used for compliance, programs for long-term operation, maintenance and monitoring must be provided by the water provider to ensure proper performance.

c. Reject water disposal options should be carefully considered before choosing this technology. See other RO limitations described Surface Water Rule Compliance Technologies Table.

d. The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small surface water systems.

e. Removal efficiencies can vary depending on water quality.

f. This technology may be very limited application to small systems. Since the process requires static mixing, detention basins, and filtration, it is most applicable to systems with sufficiently high sulfate levels that already have a suitable filtration treatment train in place.

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

h. Handling of chemicals required during regeneration and pH adjustment may be too difficult for small systems.

i. Assumes modification to a coagulation/filtration process already in place.

Table D: Compliance Technologies by System Size Category for Radionuclide National Primary Drinking Water Regulations (NPDWR's)

Contaminant	Compliance technologies[1] for system size categories (population served)		
	25-500	501-3,300	3,301-10,000
Combined radium-226 and radium-228	1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9
Gross alpha particle activity	3,4	3,4	3,4
Beta particle and photon radioactivity	1,2,3,4	1,2,3,4	1,2,3,4
Uranium	1,2,4,10,11	1,2,3,4,5,10,11	1,2,3,4,5,10,11

[1] Numbers correspond to those technologies found listed in "Table C: List of Small Systems Compliance Technologies for Radionuclides and Limitations on Use"

15.2 Monitoring frequency and compliance requirements for radionuclides in community water systems.

15.2.1 Monitoring and compliance requirements for gross alpha particle activity, radium-226, radium-228, and uranium.

15.2.1.1 Community water systems (CWSs) must conduct initial monitoring to determine compliance with subsection 15.1 by December 31, 2007. For the purpose of monitoring for gross alpha particle activity, radium-226, radium-228, uranium, and beta particle and photon radioactivity in drinking water, "detection limit" is defined as in 40 CFR 141.25(c).

15.2.1.1.1 Applicability and sampling location for existing community water systems or sources. All existing CWSs using groundwater, surface water or systems using both ground and surface water (for the purpose of this section hereafter referred to as systems) must sample at every entry point to the distribution system that is representative of all sources being used (hereafter called a sample point) under normal operating conditions. The system must take each sample at the sampling point unless conditions make another sampling point more representative of each source or the Division has designated a distribution system location, in accordance with **[sub]**section 15.2.1.2.2.3.

15.2.1.1.2 Applicability and sampling location for new community water systems or sources. All CWSs or CWSs that use a new source of water must begin to conduct initial monitoring for the new source within the first quarter after initiating use of the source. CWSs must conduct more frequent monitoring when ordered by the Division in the event of possible contamination or when changes in the distribution system or treatment processes occur that may increase the concentration of radioactivity in finished water.

15.2.1.2 Initial monitoring: Systems must conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:

15.2.1.2.1 Systems without acceptable historical data, as defined below, must collect four consecutive quarterly samples at all sampling points before December 31, 2007.

15.2.1.2.2 Grandfathering of data: The Division may allow historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point, for the following situations.

15.2.1.2.2.1 To satisfy initial monitoring requirements, a community water system having only one entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

15.2.1.2.2.2 To satisfy initial monitoring requirements, a community water system with multiple entry points and having appropriate historical monitoring data for each entry point to the distribution

system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003.

15.2.1.2.2.3 To satisfy initial monitoring requirements, a community water system with appropriate historical data for a representative point in the distribution system may use the monitoring data from the last compliance monitoring period that began between June 2000 and December 8, 2003, provided that the Division finds that the historical data satisfactorily demonstrate that each entry point to the distribution system is expected to be in compliance based upon the historical data and reasonable assumptions about the variability of contaminant levels between entry points. The Division must make a written finding indicating how the data conforms to these requirements.

15.2.1.2.3 For gross alpha particle activity, uranium, radium-226, and radium-228 monitoring, the Division may waive the final two quarters of initial monitoring for a sampling point if the results of the samples from the previous two quarters are below the detection limit.

15.2.1.2.4 If the average of the initial monitoring results for a sampling point is above the MCL, the system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Division.

15.2.1.3 Reduced monitoring: The Division may allow CWSs to reduce the future frequency of monitoring from once every three years to once every six or nine years at each sampling point, based on the following criteria.

15.2.1.3.1 If the average of the initial monitoring results for each contaminant (i.e., gross alpha particle activity, uranium, radium-226, or radium-228) is below the detection limit specified in subsection 15.2.4.3.1 Table A, the system must collect and analyze for that contaminant using at least one sample at that sampling point every nine years.

15.2.1.3.2 For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is at or above the detection limit but at or below ½ the MCL, the system must collect and analyze for that contaminant using at least one sample at that sampling point every six years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is at or above the detection limit but at or below ½ the MCL, the system must collect and analyze for that contaminant using at least one sample at that sampling point every six years.

15.2.1.3.3 For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above ½ the MCL but at or below the MCL, the system must collect and analyze at least one sample at that sampling point every three years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is above ½ the MCL but at or below the MCL, the system must collect and analyze at least one sample at that sampling point every three years.

15.2.1.3.4 Systems must use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods (e.g., if a system's sampling point is on a nine year monitoring period, and the sample result is above ½ the MCL, then the next monitoring period for that sampling point is three years).

15.2.1.3.5 If a system has a monitoring result that exceeds the MCL while on reduced monitoring, the system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Division.

15.2.1.4 Compositing: To fulfill quarterly monitoring requirements for gross alpha particle activity, radium-226, radium-228, or uranium, a system may composite up to four consecutive quarterly samples from a single entry point if analysis is done within a year of the first sample. The Division will treat analytical results from the composited as the average analytical result to determine compliance with the MCLs and the future monitoring frequency. If the analytical result from the composited sample is greater than ½ the MCL, the Division may direct the system to take additional quarterly samples before allowing the system to sample under a reduced monitoring schedule.

15.2.1.5 A gross alpha particle activity measurement may be substituted for the required radium-226 measurement provided that the measured gross alpha particle activity does not exceed 5 pCi/L. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/L. The gross alpha measurement shall have a confidence interval of 95% (1.65s, where s is the

standard deviation of the net counting rate of the sample) for radium-226 and uranium. When a system uses a gross alpha particle activity measurement in lieu of radium-226 and/or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, ½ the detection limit will be used to determine compliance and the future monitoring frequency.

15.2.2 Monitoring and compliance requirements for beta particle and photon radioactivity. To determine compliance with the maximum contaminant levels in subsection 15.1.1.4 for beta particle and photon radioactivity, a system must monitor at a frequency as follows.

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

15.2.2.1.1 If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 50 pCi/L (screening level), the Division may reduce the frequency of monitoring at that sampling point to once every three years. Systems must collect all samples required in subsection 15.2.2.1 during the reduced monitoring period.

15.2.2.1.2 For systems in the vicinity of a nuclear facility, the Division may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Division determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems that are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with subsection 15.2.2.1.

15.2.2.2 Community water systems (both surface and ground water) designated by the Division as utilizing waters contaminated by effluents from nuclear facilities must sample for beta particle and photon radioactivity. Systems must collect quarterly samples for beta emitters and iodine-131 and annual samples for tritium and strontium-90 at each entry point to the distribution system (hereafter called a sampling point), beginning within one quarter after being notified by the Division. Systems already designated by the Division as systems using waters contaminated by effluents from nuclear facilities must continue to sample until the Division reviews and either reaffirms or removes the designation.

15.2.2.2.1 Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of three monthly samples. The former is recommended.

15.2.2.2.2 For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. As ordered by the Division, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water.

15.2.2.2.3 Annual monitoring for strontium-90 and tritium shall be conducted by means of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The latter procedure is recommended.

15.2.2.2.4 If the gross beta particle activity beta minus the naturally occurring potassium-40 beta particle at a sampling point has a running annual average (computed quarterly) less than or equal to 15 pCi/L, the Division may reduce the frequency of monitoring at that sampling point to every three years. Systems must collect all samples required in subsection 15.2.2.1 during the reduced monitoring period.

15.2.2.2.5 For systems in the vicinity of a nuclear facility, the Division may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the Division determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems that are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with subsection 15.2.2.2.

15.2.2.3 Community water systems designated by the Division to monitor for beta particle and photon radioactivity cannot apply to the Division for a waiver from the monitoring frequencies specified in subsections 15.2.2.1 or 15.2.2.2.

15.2.2.4 Community water systems may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. Systems are allowed to subtract the potassium-40 beta particle activity value from the total gross beta particle activity value to determine if the screening level is exceeded. The potassium-40 beta particle activity must be calculated by multiplying elemental potassium concentrations (in mg/L) by a factor of 0.82.

15.2.2.5 If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity exceeds the appropriate screening level, an analysis of the sample must be performed to identify the major radioactive constituents present in the sample and the appropriate doses must be calculated and summed to determine compliance with subsection 15.1.1, using the formula in subsection 15.1.1.4.2. Doses must also be calculated and combined for measured levels of tritium and strontium to determine compliance.

15.2.2.6 Systems must monitor monthly at the sampling point(s) that exceed the MCL in subsection 15.1.1 beginning the month after the exceedance occurs. Systems must continue monthly monitoring until the system has established, by a rolling average of three monthly samples, that the MCL is being met. Systems who establish that the MCL is being met must return to quarterly monitoring until they meet the requirements set forth in subsections 15.2.2.1.2 or 15.2.2.2.1.

15.2.3 General monitoring and compliance requirements for radionuclides.

15.2.3.1 The Division may require more frequent monitoring than specified in subsections 15.2.1 and 15.2.2, or may require confirmation samples at its discretion. The results of the initial and confirmation samples will be averaged for use in compliance determinations.

15.2.3.2 Each public water system shall monitor at the time designated by the Division during each compliance period.

15.2.3.3 Compliance: Compliance with subsection 15.1.1 will be determined based on the analytical result(s) obtained at each sampling point. If one sampling point is in violation of a MCL, the system is in violation of the MCL.

15.2.3.3.1 For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. If the average of any sampling point is greater than the MCL, then the system is out of compliance with the MCL.

15.2.3.3.2 For systems monitoring more than once per year, if any sample result will cause the running annual average to exceed the MCL at any sample point, the system is out of compliance with the MCL immediately.

15.2.3.3.3 Systems must include all samples taken and analyzed under the provisions of this section in determining compliance, even if that number is greater than the minimum required.

15.2.3.3.4 If a system does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance will be based on the running average of the samples collected.

15.2.3.3.5 If a sample result is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226 and/or uranium. If the gross alpha particle activity result is less than detection, ½ the detection limit will be used to calculate the annual average.

15.2.3.4 The Division has the discretion to delete results of obvious sampling or analytical errors.

15.2.3.5 If the MCL for radioactivity set forth in subsection 15.1.1 is exceeded, the operator of a community water system must give notice to the Division pursuant to subsection 4.1.2 and to the public as required in subsection 4.2.

15.2.4 Analytical Methodology:

15.2.4.1 The methods specified in 40 CFR 141.25(a), copies may be obtained from the Office of Drinking Water, are to be used to determine compliance with Section 15.0.

15.2.4.2 When the identification and measurement of radionuclides other than those listed in subsection 15.2.4.1 is required, the following references are to be used, except in cases where alternative methods have been approved in accordance with 40 CFR 141.27.

15.2.4.2.1 Procedures for Radiochemical Analysis of Nuclear Reactor Aqueous Solutions, H. L. Krieger and S. Gold, EPA-R4-73-014. USEPA, Cincinnati, Ohio, May 1973

15.2.4.2.2 HASL Procedure Manual, Edited by John H. Harley. HASL 300, ERDA Health and Safety Laboratory, New York, NY. 1973

15.2.4.3 For the purpose of monitoring radioactivity concentrations in drinking water, the required sensitivity of the radioanalysis is defined in terms of a detection limit. The detection limit shall be that

concentration which can be counted with a precision of plus or minus one hundred (100) percent at the ninety-five (95) percent confidence level (1.96σ where σ is the standard deviation of the net counting rate of the sample).

15.2.4.3.1 To determine compliance with **[subsections]** 15.1.1.2, 15.1.1.3, and 15.1.1.5 the detection limit shall not exceed the concentrations in Table A to this paragraph.

Table A. – Detection Limits for Gross Alpha Particle Activity, Radium 226, Radium 228, and Uranium

Contaminant	Detection Limit
Gross alpha particle activity	3 pCi/L
Radium 226	1 pCi/L
Radium 228	1 pCi/L
Uranium	1ug/L

15.2.4.3.2 To determine compliance with **[subsection]** 15.1.1.4 the detection limits shall not exceed the concentrations listed in Table B to this paragraph.

Table B. – Detection Limits for Man-Made Beta Particle and Photon Emitters

Radionuclide	Detection Limit
Tritium	1,000 pCi/L
Strontium-89	10 pCi/L
Strontium-90	2 pCi/L
Iodine-131	1 pCi/L
Cesium-134	10 pCi/L
Gross beta	4 pCi/L
Other radionuclides	1/10 of the applicable limit

15.2.4.4 To judge compliance with the maximum contaminant levels listed in **[subsections]** 15.1.1.2 and 15.1.1.4 averages of the data shall be used and shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

15.2.4.5 The Division has the authority to determine compliance or initiate enforcement action based on analytical results or other information compiled by sanctioned representatives and agencies.

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

16.0 Surface Water Treatment Rule

16.1 Untreated Water: The use of untreated (without filtration and disinfection) surface water or untreated ground water under the direct influence of surface water shall be prohibited.

16.2 General Requirements: Each public water system with a surface water source or a ground water source under the direct influence of surface water must be operated by qualified personnel who meet the requirements of the Division and must provide treatment of that source water that complies with these treatment technique requirements. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

16.2.1 At least 99.9 percent (3-log) removal and/or inactivation of Giardia lamblia cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer; and

16.2.2 At least 99.99 percent (4-log) removal and/or inactivation of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

16.2.3 In addition to complying with the requirements in this section, systems serving fewer than 10,000 people must also comply with the requirements in **[sub]**section 16.13.

16.3 Disinfection: Each public water system with a surface water source or a ground water source under the direct influence of surface water must provide treatment consisting of both filtration as specified in subsection 16.4 and disinfection as follows:

16.3.1 The disinfection treatment must be sufficient to ensure that the total treatment processes of that system achieve at least 99.9 percent (3-log) inactivation and/or removal of Giardia lamblia cysts and at least 99.99 percent (4-log) inactivation and/or removal of viruses, as determined by the Division.

16.3.2 The residual disinfectant concentration in the water entering the distribution system, measured as specified in subsection 16.5 cannot be less than 0.3 mg/L for more than four (4) hours.

16.3.3 The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in subsection 16.5 cannot be undetectable, a chlorine residual of <0.04 mg/L is deemed to be undetectable, in more than five (5) percent of the samples each month, for any two (2) 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 five hundred (500) per milliliter, measured as heterotrophic plate count (HPC) as specified in subsection 16.6, 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 five (5) percent in one (1) month, for any two (2) consecutive months.

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

where:

a = number of instances where the residual disinfectant concentration is measured;

b = number of instances where the residual disinfectant concentration is not measured but HPC is measured;

c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d = number of instances where no residual disinfectant concentration is detected and where the HPC is >500/ml; and

e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

If the Division determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by an approved laboratory under the requisite time and temperature conditions specified in subsection 16.6, and that the system is providing adequate disinfection in the distribution system, the requirements of this Section do not apply.

16.4 Filtration: Each public water system with a surface water source or a ground water source under the direct influence of surface water must provide treatment consisting of both disinfection as specified in subsection 16.3 and filtration that complies with any one (1) of the following by June 29, 1993:

16.4.1 Conventional Filtration or Direct Filtration - For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered must be less than or equal to 0.5 NTU in at least ninety-five (95) percent of the measurements taken each month, measured as specified in subsection 16.6, except that if the Division determines that the system is capable of achieving at least 99.9 percent removal and/or inactivation of Giardia lamblia cysts at some turbidity level higher than 0.5 NTU in at least ninety-five (95) percent of the measurements taken each month, the Division may substitute this higher turbidity limit for that system. However, in no case may the Division approve a turbidity limit that allows more than one (1) NTU in more than five (5) percent of the samples taken each month, measured as specified in subsection 16.6. The turbidity level of representative samples of a system's filtered water must at no time exceed five (5) NTU, measured as specified in subsection 16.6.

16.4.2 Slow Sand Filtration - For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to one (1) NTU in at least ninety-five (95) percent of the measurements taken each month, measured as specified in subsection 16.6, except that if the Division determines there is no significant interference with disinfection at a higher turbidity level, the Division may substitute the higher turbidity limit for that system.

16.4.3 Diatomaceous Earth Filtration - For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to one (1) NTU in at least

ninety-five (95) percent of the measurements taken each month, measured as specified in subsection 16.6. The turbidity level of representative samples of a system's filtered water must at no time exceed five (5) NTU, measured as specified in subsection 16.6.

16.4.4 Other Filtration Technologies - A public water system may use a filtration technology not listed in this section if it demonstrates to the Division, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of subsection 16.3, consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses. For a system that makes this demonstration, the requirements of subsection 16.4.2 apply. Beginning January 1, 2002 systems serving at least 10,000 people must meet the requirements for other filtration technologies in subsection 16.9.2. Beginning January 1, 2005 systems serving fewer than 10,000 people must meet the requirements for other filtration technologies in 40 CFR subpart T. Copies are available from the Office of Drinking Water.

16.4.5 Beginning January 1, 2005 systems serving fewer than 10,000 people must meet the turbidity requirements in 40 CFR subpart T. Copies are available from the Office of Drinking Water.

16.5 Monitoring Requirements: - A public water system that uses a surface water source or a ground water source under the direct influence of surface water must monitor in accordance with the following by June 29, 1993:

16.5.1 Turbidity measurements as required by subsection 16.4 must be performed on representative samples of the system's filtered water at least every four (4) hours that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the Division. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration or diatomaceous earth filtration, the Division may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. For systems serving five hundred (500) or fewer persons, the Division may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the Division determines that less frequent monitoring is sufficient to indicate effective filtration performance.

16.5.2 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 (4) hours may be conducted in lieu of continuous monitoring, but for no more than five (5) working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:

System Population	Samples/Day*
<500	1
501-1,000	2
1,001-2,500	3
2,501-3,300	4

*The day's samples cannot be taken at the same time. The sampling intervals are subject to Division review and approval.

If at any time the residual disinfectant concentration falls below 0.3 mg/L in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every four (4) hours until the residual disinfectant concentration is equal to or greater than 0.3 mg/L.

16.5.3 Until December 31, 2015 the residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in Section 7.0. Beginning January 1, 2016, the residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in subsections 7.4.4 through 7.4.8. The Division may allow a public water system which uses both a surface water source or a ground water source under the direct influence of surface water, and a ground water source to take disinfectant residual samples at points other than the total coliform sampling points if the Division determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as HPC as specified in subsection 16.6, may be measured in lieu of residual disinfectant concentration. If the Division determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by an approved laboratory under the requisite time and temperature conditions specified in

subsection 16.6 and that the system is providing adequate disinfection in the distribution system, the requirements of this Section do not apply.

16.6 Analytical Methodology - Only the analytical method(s) specified in this section, or otherwise approved by EPA, may be used to demonstrate compliance with subsections 16.2, 16.3 and 16.4. Measurement for pH, temperature, turbidity and residual disinfectant concentration must be conducted by a party approved by the Division. Measurements for total coliforms, fecal coliforms and HPC must be conducted by an approved laboratory. Until laboratory approval criteria are developed for the analysis of HPC and fecal coliforms, any laboratory approved for total coliform analysis is deemed approved for HPC and fecal coliform analysis. The following procedures shall be performed in accordance with the publications listed in the following section. This incorporation by reference was approved by the Director of the Federal register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the methods published in Standard Methods published in Standard Methods for the Examination of Water and Wastewater may be obtained from the American Public Health Association et al. 1015 Fifteenth Street, NW., Washington, 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 Coliforms and Escherichia coli from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method" (Edberg et al), Applied and Environmental Microbiology, Volume 54, pp.1595-1601, June 1988 (as amended under Erratum, Applied and Environmental Microbiology, Volume 54, p. 3197, December 1988), may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Ave., 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 and Engineering, Pergammon Press Ltd., Fairview Park, Elmsford, New York 10523. Copies may be inspected at the U.S.E.P.A., Room EB15, 401 M Street SW., Washington, D.C. 20460 or at the Office of the Federal register, 1100 L Street, NW., Room 8401, Washington, D.C.

16.6.1 Total Coliform Concentration - See subsection 7.2.

16.6.2 Fecal Coliform Concentration - See subsection 7.2

16.6.3 Heterotrophic Plate Count - Method 907A (Pour Plate Method), pp. 864-866, as set forth in Standard Methods for the Examination of water and Wastewater, 1986, American Public Health Association et al., 16th edition.

16.6.4 Turbidity - See section 17.4, 40 CFR 141.74(a)(1)

16.6.5 Residual Disinfectant Concentration - Residual disinfectant concentrations for free chlorine and combined chlorine (chloramines) must be measured by Method 408C (Amperometric Titration Method), pp. 303-306, Method 408D (DPD Ferrous Titrametric Method), pp. 306-309, Method 408E (DPD Colorimetric Method), pp. 309-310, or Method 408F (Leuco Crystal Violet Method), pp. 310-313, as set forth in Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., 16th edition. Residual disinfectant concentrations for free chlorine and combined chlorine may also be measured by using DPD colorimetric test kits if approved by the Division. Residual disinfectant concentration for ozone must be measured by the Indigo Method as set forth in Bader, H., Hoigne, J., "Determination of Ozone in Water by the Indigo Method; A submitted Standard Method"; Ozone Science and Engineering, Vol. 4 pp. 169-176, Pergammon Press Ltd., 1982, or automated methods which are calibrated in reference to the results obtained by the Indigo Method on a regular basis, if approved by the Division (NOTE - This method will be published in the 17th edition of Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., the Iodometric Method in the 16th edition may not be used). Residual disinfectant concentrations for chlorine dioxide must be measured by Method 410B (Amperometric Method) or Method 410C (DPD Method), pp. 322-324, as set forth in Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., 16th edition.

16.6.6 Temperature - Method 212 (Temperature), pp. 126-127, as set forth in Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., 16th edition.

16.6.7 pH - Method 423 (pH Value), pp. 429-437, as set forth in Standard Methods for the Examination of Water and Wastewater, 1985, American Public Health Association et al., 16th edition.

16.6.7.1 "Methods of Chemical analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268 (EPA-600/4-79-020), March 1985. Available from ORD Publications, CERI, EPA, Cincinnati, Ohio 45268

16.6.7.2 Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19013.

16.6.7.3 "Standard Methods for the Examination of Water and Wastewater," 16th Edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1985.

16.6.7.4 "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," Techniques of Water-Resources Investigations of the United States Geological Survey Books, Chapter A1, 1985, Open-File Report 85-495. Available from Open-File Services section, Western Distribution Branch, U.S. Geological Survey, MS 306 Box 24525, Denver Federal Center, Denver, Colorado 80225.

16.6.7.5 "Fluoride in Water and Wastewater. Industrial Method #129-71 W." Technicon Industrial Systems. Tarrytown, New York 10591, December 1972.

16.6.7.6 "Fluoride in Water and Wastewater," Technicon Industrial Systems. Tarrytown, New York 10591, February 1976.

16.6.7.7 "Orion Guide to Water and Wastewater Analysis." Form WeEEG/5880, p. 5, 1985. Orion Research, Inc., Cambridge, Maryland.

16.6.7.8 "Inductively Coupled Plasma Atomic Emission Analysis of Drinking Water," Appendix to Method 200.7, September 1985. U.S.E.P.A. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

16.6.7.9 The addition of 1 ml of 30% of H2O2 to each 100 ml of standards and samples is required before analysis.

16.6.7.10 Prior to dilution of the Arsenic and Selenium calibration standards, add 2 ml of 30% H2O2 for each 100 ml of standard.

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

17.0 Interim Enhanced Surface Water Treatment Rule:

17.1 The requirements of this section constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required by surface water or ground water under the direct influence of surface water systems. The requirements of this section are applicable to surface water or ground water under the direct influence of surface water systems serving at least 10,000 people, beginning December 17, 2001 unless otherwise specified in this section. The regulations in this section establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: Giardia lamblia, viruses, heterotrophic plate count bacteria, Legionella, Cryptosporidium, and turbidity. Each surface water or ground water under the direct influence of surface water system serving at least 10,000 people must provide treatment of its source water that complies with these treatment technique requirements and are in addition to those identified in subsection 16.2. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

17.1.1 At least 99 percent (2-log) removal of Cryptosporidium between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or Cryptosporidium control under the watershed control plan for unfiltered systems.

17.1.2 Compliance with the profiling and benchmark requirements under the provisions of **[sub]**section 17.5.

17.2 A public water system subject to the requirements of this section is considered to be in compliance with the requirements of subsection 17.1 if:

17.2.1 It meets the applicable filtration requirements in either subsections 16.4 or 17.9 and the disinfection requirements in subsections 16.3 and 17.5.

17.3 Systems are not permitted to begin construction of uncovered finished water storage facilities beginning February 16, 1999.

17.4 Surface water or ground water under the direct influence of surface water systems that did not conduct optional monitoring under subsection 17.5 because they served fewer than 10,000 people when such monitoring was required, but serve more than 10,000 people prior to January 1, 2005 must comply with subsections 16.1, 17.5, 17.6, 17.7 and 17.8. These systems must also consult with the Division to establish a disinfection benchmark. A system that decides to make a significant change to its disinfection practice, as described in **[sub]**sections 17.5.3.1.1 through 17.5.3.1.4 must consult with the Division prior to making such change.

17.5 Disinfection Profiling and Benchmarking.

17.5.1 Determination of systems required to profile. A public water system subject to the requirements of this section must determine its TTHM annual average using the procedure in subsection 17.5.1.1 and its HAA5 annual average using the procedure in subsection 17.5.1.2. The annual average is the arithmetic average of the quarterly averages of four consecutive quarters of monitoring.

17.5.1.1 The TTHM annual average must be the annual average during the same period as is used for the HAA5 annual average.

17.5.1.1.1 Those systems that collected data under the provisions of 61 FR 24368, May 14, 1996 must use the results of the samples collected during the last four quarters of required monitoring under the Information Collection Rule.

17.5.1.1.2 Those systems that use “grandfathered” HAA5 occurrence data that meet the provisions of subsection 17.5.1.2.2 must use TTHM data collected at the same time under the provisions of 40 CFR 141.12 and 141.30. Copies may be obtained from the Office of Drinking Water.

17.5.1.1.3 Those systems that use HAA5 occurrence data that meet the provisions of subsection 17.5.1.2.3.1 must use TTHM data collected at the same time under the provisions of 40 CFR 141.12 and 141.30. Copies may be obtained from the Office of Drinking Water.

17.5.1.2 The HAA5 annual average must be the annual average during the same period as is used for the TTHM annual average.

17.5.1.2.1 Those systems that collected data under the provisions of 61 FR 24368, May 14, 1996 must use the results of the samples collected during the last four quarters of required monitoring under the Information Collection Rule.

17.5.1.2.2 Those systems that have collected four quarters of HAA5 occurrence data that meets the routine monitoring sample number and location requirements for TTHM in 40 CFR 141.12 and 141.30 and handling and analytical method requirements of the Information Collection Rule may use those data to determine whether the requirements of this section apply. Copies may be obtained from the Office of Drinking Water.

17.5.1.2.3 Those systems that have not collected four quarters of HAA5 occurrence data that meets the provisions of either subsections 17.5.1.2.1 or 17.5.1.2.2 by March 16, 1999 must either:

17.5.1.2.3.1 Conduct monitoring for HAA5 that meets the routine monitoring sample number and location requirements for TTHM in 40 CFR 141.12 and 141.30 and handling and analytical method requirements of 61 FR 24368, May 14, 1996. Copies may be obtained from the Office of Drinking Water, to determine the HAA5 annual average and whether the requirements of section 17.5.2 apply. This monitoring must be completed so that the applicability determination can be made no later than March 16, 2000, or

17.5.1.2.3.2 Comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with **[sub]**section 17.5.2.

17.5.1.3 The system may request that the Division approve a more representative annual data set than the data set determined under **[sub]**sections 17.5.1.1 or 17.5.1.2 for the purpose of determining applicability of the requirements of this section.

17.5.1.4 The Division may require that a system use a more representative annual data set than the data set determined under subsections 17.5.1.1 or 17.5.1.2 for the purpose of determining applicability of the requirements of this section.

17.5.1.5 The system must submit data to the Division on the schedule in subsections 17.5.1.5.1 through 17.5.1.5.5.

17.5.1.5.1 Those systems that collected TTHM and HAA5 data under the provisions of 61 FR 2436, May 14, 1996, as required by subsections 17.5.1.1.1 and 17.5.1.2.1, must submit the results of the samples collected during the last 12 months of required monitoring under 61 FR 2436, May 14, 1996 not later than December 16, 1999. Copies may be obtained from the Office of Drinking Water.

17.5.1.5.2 Those systems that have collected four consecutive quarters of HAA5 occurrence data that meets the routine monitoring sample number and location for TTHM in 40 CFR 141.12 and 141.30 and handling and analytical method requirements 61 FR 2436, May 14, 1996, copies may be obtained from the Office of Drinking Water, as allowed by subsections 17.5.1.1.2 and 17.5.1.2.2, must submit those data to the Division not later than April 16, 1999. Until the Division has approved the data, the system must conduct monitoring for HAA5 using the monitoring requirements specified under subsection 17.5.1.2.3

17.5.1.5.3 Those systems that conduct monitoring for HAA5 using the monitoring requirements specified by subsections 17.5.1.1.3 and 17.5.1.2.3.1, must submit TTHM and HAA5 data not later than March 16, 2000.

17.5.1.5.4 Those systems that elect to comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with this section, as allowed under subsection 17.5.1.2.3.2, must notify the Division in writing of their election not later than December 16, 1999.

17.5.1.5.5 If the system elects to request that the Division approve a more representative annual data set than the data set determined under subsection 17.5.1.2.1, the system must submit this request in writing not later than December 16, 1999.

17.5.1.6 Any system having either a TTHM annual average >0.064 mg/L or an HAA5 annual average >0.048 mg/L during the period identified in subsections 17.5.1.1 and 17.5.1.2 must comply with subsection 17.5.2.

17.5.2 Disinfection profiling.

17.5.2.1 Any system that meets the criteria in subsection 17.5.1.6 must develop a disinfection profile of its disinfection practice for a period of up to three years.

17.5.2.2 The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of 40 CFR 141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than March 16, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in subsections 17.5.2.2.1 through 17.5.2.2.4. A system with more than one point of disinfectant application must conduct the monitoring in subsections 17.5.2.2.1 through 17.5.2.2.4 for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in 40 CFR 141.74(a), copies may be obtained from the Office of Drinking Water, as follows:

17.5.2.2.1 The temperature of the disinfected water must be measured once per day at each residual disinfectant concentration sampling point during peak hourly flow.

17.5.2.2.2 If the system uses chlorine, the pH of the disinfected water must be measured once per day at each chlorine residual disinfectant concentration sampling point during peak hourly flow.

17.5.2.2.3 The disinfectant contact time(s) (“T”) must be determined for each day during peak hourly flow.

17.5.2.2.4 The residual disinfectant concentration(s) (“C”) of the water before or at the first customer and prior to each additional point of disinfection must be measured each day during peak hourly flow.

17.5.2.3 In lieu of the monitoring conducted under the provisions of subsection 17.5.2.2 to develop the disinfection profile, the system may elect to meet the requirements of subsection 17.5.2.3.1. In addition to the monitoring conducted under the provisions of subsection 17.5.2.2 to develop the disinfection profile, the system may elect to meet the requirements of subsection 17.5.2.3.2.

17.5.2.3.1 A PWS that has three years of existing operational data may submit those data, a profile generated using those data, and a request that the Division approve use of those data in lieu of monitoring under the provisions of subsection 17.5.2.2 not later than March 16, 2000. The Division must determine whether these operational data are substantially equivalent to data collected under the provisions of subsection 17.5.2.2. These data must also be representative of Giardia lamblia inactivation through the entire treatment plant and not just of certain treatment segments. Until the Division approves this request, the system is required to conduct monitoring under the provisions of subsection 17.5.2.2.

17.5.2.3.2 In addition to the disinfection profile generated under subsection 17.5.2.2, a PWS that has existing operational data may use those data to develop a disinfection profile for additional years. Such systems may use these additional yearly disinfection profiles to develop a benchmark under the provisions of subsection 17.5.3. The Division must determine whether these operational data are substantially equivalent to data collected under the provisions of subsection 17.5.2.2. These data must also be representative of inactivation through the entire treatment plant and not just of certain treatment segments.

17.5.2.4 The system must calculate the total inactivation ratio as follows:

17.5.2.4.1 If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio for the disinfection segment based on either of the methods in subsections 17.5.2.4.1.1 or 17.5.2.4.1.2.

17.5.2.4.1.1 Determine one inactivation ratio CTcalc/CT99.9 before or at the first customer during peak hourly flow.

17.5.2.4.1.2 Determine successive CTcalc/ CT99.9 values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining (CTcalc/CT99.9) for each sequence and then adding the (CTcalc/CT99.9) values together to determine ($\sum$(CTcalc/ CT99.9)).

17.5.2.4.2 If the system uses more than one point of disinfectant application before the first customer, the system must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The (CTcalc/CT99.9) value of each segment and (∑(CTcalc/CT99.9)) must be calculated using the method in subsection 17.5.2.4.1.

17.5.2.4.3 The system must determine the total logs of inactivation by multiplying the value calculated in subsection 17.5.2.4.1 or 17.5.2.4.2 by 3.0.

17.5.2.5 A system that uses either chloramines or ozone for primary disinfection must also calculate the logs of inactivation for viruses using a method approved by the Division.

17.5.2.6 The system must retain disinfection profile data in graphic form, as a spreadsheet, or in some other format acceptable to the Division for review as part of sanitary surveys conducted by the Division.

17.5.3 Disinfection benchmarking.

17.5.3.1 Any system required to develop a disinfection profile under the provisions of subsections 17.5.1 and 17.5.2 and that decides to make a significant change to its disinfection practice must consult with the Division prior to making such change. Significant changes to disinfection practice are:

17.5.3.1.1 Changes to the point of disinfection;

17.5.3.1.2 Changes to the disinfectant(s) used in the treatment plant;

17.5.3.1.3 Changes to the disinfection process; and

17.5.3.1.4 Any other modification identified by the Division.

17.5.3.2 Any system that is modifying its disinfection practice must calculate its disinfection benchmark using the procedure specified in subsections 17.5.3.2.1 through 17.5.3.2.2.

17.5.3.2.1 For each year of profiling data collected and calculated under subsection 17.5.2, the system must determine the lowest average monthly Giardia lamblia inactivation in each year of profiling data. The system must determine the average Giardia lamblia inactivation for each calendar month for each year of profiling data by dividing the sum of daily Giardia lamblia of inactivation by the number of values calculated for that month.

17.5.3.2.2 The disinfection benchmark is the lowest monthly average value (for systems with one year of profiling data) or average of lowest monthly average values (for systems with more than one year of profiling data) of the monthly logs of Giardia lamblia inactivation in each year of profiling data.

17.5.3.2.3 A system that uses either chloramines or ozone for primary disinfection must also calculate the disinfection benchmark for viruses using a method approved by the Division.

17.5.3.2.4 The system must submit information in subsections 17.5.3.4.1 through 17.5.3.4.4 to the Division as part of its consultation process.

17.5.3.2.4.1 A description of the proposed change;

17.5.3.2.4.2 The disinfection profile for Giardia lamblia (and, if necessary, viruses) under subsection 17.5.2 and benchmark as required by subsection 17.5.3.2; and

17.5.3.2.4.3 An analysis of how the proposed change will affect the current levels of disinfection.

17.5.3.2.4.4 Any additional information requested by the Division.

17.6 Filtration Interim Enhanced Surface Water Treatment Rule: A public water system subject to the requirements of this section must provide treatment consisting of both disinfection, as specified in subsection 16.3, and filtration treatment which complies with the requirements of subsections 17.6.1 or 17.6.2 or subsection 16.4 by December 17, 2001.

17.6.1 Conventional filtration treatment or direct filtration.

17.6.1.1 For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month, measured as specified in 40 CFR 141.74(a) and (c).

17.6.1.2 The turbidity level of representative samples of a system's filtered water must at no time exceed 1 NTU, measured as specified in 40 CFR 141.74(a) and (c).

17.6.1.3 A system that uses lime softening may acidify representative samples prior to analysis using a protocol approved by the Division.

17.6.2 Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in subsection 17.6.1 or in 40 CFR 141.73(b) or (c) if it demonstrates to the Division, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the

requirements of subsection 16.3, consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts, and the Division approves the use of the filtration technology. For each approval, the Division will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts.

17.7 Filtration sampling requirements:

17.7.1 Monitoring requirements for systems using filtration treatment. In addition to monitoring required by 40 CFR 141.74, a public water system subject to the requirements of this section that provides conventional filtration treatment or direct filtration must conduct continuous monitoring of turbidity for each individual filter using an approved method in 40 CFR 141.74(a) and must calibrate turbidimeters using the procedure specified by the manufacturer. Systems must record the results of individual filter monitoring every 15 minutes.

17.7.2 If there is a failure in the continuous turbidity monitoring equipment, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

17.8 Reporting and recordkeeping requirements: In addition to the reporting and recordkeeping requirements in 40 CFR 141.75, a public water system subject to the requirements of this section that provides conventional filtration treatment or direct filtration must report monthly to the Division the information specified in subsections 17.8.1 and 17.8.2 beginning December 17, 2001. In addition to the reporting and recordkeeping requirements in 40 CFR 141.75, a public water system subject to the requirements of this section that provides filtration approved under subsection 17.6.2 must report monthly to the Division the information specified in 17.8.1 beginning December 17, 2001. The reporting in subsection 17.8.1 is in lieu of the reporting specified in 40 CFR 141.75(b)(1).

17.8.1 Turbidity measurements as required by subsection 17.6 must be reported within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:

17.8.1.1 The total number of filtered water turbidity measurements taken during the month.

17.8.1.2 The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in subsections 17.6.1 or 17.6.2.

17.8.1.3 The date and value of any turbidity measurements taken during the month which exceed 1 NTU for systems using conventional filtration treatment or direct filtration, or which exceed the maximum level set by the Division under subsection 17.6.2

17.8.2 Systems must maintain the results of individual filter monitoring taken under subsection 17.7 for at least three years. Systems must report that they have conducted individual filter turbidity monitoring under subsection 17.7 within 10 days after the end of each month the system serves water to the public. Systems must report individual filter turbidity measurement results taken under subsection 17.7 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in subsections 17.8.2.1 through 17.8.2.4. Systems that use lime softening may apply to the Division for alternative exceedance levels for the levels specified in subsections 17.8.2.1 through 17.8.2.4 if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.

17.8.2.1 For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.

17.8.2.2 For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.

17.8.2.3 For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive

months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self-assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.

17.8.2.4 For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation (CPE), as defined in Section 2.0, by the Division or a third party approved by the Division no later than 30 days following the exceedance and have the evaluation completed and submitted to the Division no later than 90 days following the exceedance. In consultation with the Division, the water supplier must implement any follow-up recommendations that result, as part of the CPE.

17.8.3 Additional reporting requirements:

17.8.3.1 If at any time the turbidity exceeds 1 NTU in representative samples of filtered water in a system using conventional filtration treatment or direct filtration, the system must inform the Division as soon as possible, but no later than the end of the next business day.

17.8.3.2 If at any time the turbidity in representative samples of filtered water exceeds the maximum level set by the Division under subsection 17.9.2 for filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, the system must inform the Division as soon as possible, but no later than the end of the next business day.

18.0 Recycle Rule

18.1 Applicability: All surface water or ground water under the direct influence of surface water systems that employ conventional filtration or direct filtration treatment and that recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes must meet the requirements in subsections 18.2 through 18.4.

18.2 Reporting: A system must notify the Division in writing by December 8, 2003 if the system recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes. This notification must include, at a minimum, the information specified in subsections 18.2.1 and 18.2.2.

18.2.1 A plant schematic showing the origin of all flows that are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are reintroduced back into the treatment plant.

18.2.2 Typical recycle flow in gallons per minute (gpm), the highest observed plant flow experienced in the previous year (gpm), design flow for the treatment plant (gpm), and Division-approved operating capacity for the plant where the Division has made such a determination.

18.3 Treatment Technique Requirement: Any system that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes must return these flows through the processes of a system's existing conventional or direct filtration system as defined in Section 1.0 or at an alternate location approved by the Division by June 8, 2004. If capital improvements are required to modify the recycle location to meet this requirement, all capital improvements must be completed no later than June 8, 2006.

18.4 Recordkeeping: The system must collect and retain on file recycle flow information specified in subsections 18.4.1 through 18.4.6 for review and evaluation by the Division beginning June 8, 2004.

18.4.1 Copy of the recycle notification and information submitted to the Division under subsection 18.2.

18.4.2 List of all recycles flows and the frequency with which they are returned.

18.4.3 Average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes.

18.4.4 Typical filter run length and a written summary of how filter run length is determined.

18.4.5 The type of treatment provided for the recycle flow.

18.4.6 Data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used and average dose and frequency of use, and frequency at which solids are removed, if applicable.

19.0 Enhanced Filtration and Disinfection – Systems Serving Fewer Than 10,000 People

Additional requirements for the systems serving fewer than 10,000 people. In addition to complying with the requirements of Sections 16.0, 17.0, 18.0 and 20.0 of these regulations, systems using surface water or groundwater under the direct influence of surface water and serving fewer than 10,000 people must also comply with 40 CFR subpart T. Copies are available from the Office of Drinking Water.

20.0 Enhanced Treatment for Cryptosporidium

20.1 General requirements for the Long Term 2 Enhanced Surface Water Treatment Rule.

20.1.1 The requirements of Section 20.0 are national primary drinking water regulations. The regulations in this section establish or extend treatment technique requirements in lieu of maximum contaminant levels for Cryptosporidium. These requirements are in addition to requirements for filtration and disinfection in Sections 16.0, 17.0, and 19.0 of these regulations.

20.1.2 Applicability. The requirements of this section apply to all subpart H systems, which are public water systems supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water.

20.1.2.1 Wholesale systems, as defined in Section 1.0, must comply with the requirements of this section based on the population of the largest system in the combined distribution system.

20.1.2.2 The requirements of this section for filtered systems apply to systems required by National Primary Drinking Water Regulations to provide filtration treatment, whether or not the system is currently operating a filtration system.

20.1.2.3 The requirements of this section for unfiltered systems apply only to unfiltered systems that timely met and continue to meet the filtration avoidance criteria in Sections 16.0, 17.0, and 19.0 of this regulation, as applicable.

20.1.3 Requirements. Systems subject to this section must comply with the following requirements:

20.1.3.1 Systems must conduct an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI source. This monitoring may include sampling for Cryptosporidium, E. coli, and turbidity as described in subsections 20.2 through 20.7, to determine what level, if any, of additional Cryptosporidium treatment they must provide.

20.1.3.2 Systems that plan to make a significant change to their disinfection practice must develop disinfection profiles and calculate disinfection benchmarks, as described in subsections 20.9 through 20.10.

20.1.3.3 Filtered systems must determine their Cryptosporidium treatment bin classification as described in subsection 20.11 and provide additional treatment for Cryptosporidium, if required, as described in subsection 20.12. All unfiltered systems must provide treatment for Cryptosporidium as described in subsection 20.13. Filtered and unfiltered systems must implement Cryptosporidium treatment according to the schedule in subsection 20.14.

20.1.3.4 Systems with uncovered finished water storage facilities must comply with the requirements to cover the facility or treat the discharge from the facility as described in subsection 20.15.

20.1.3.5 Systems required to provide additional treatment for Cryptosporidium must implement microbial toolbox options that are designed and operated as described in subsections 20.16 through 20.21.

20.1.3.6 Systems must comply with the applicable recordkeeping and reporting requirements described in subsections 20.22 through 20.23.

20.1.3.7 Systems must address significant deficiencies identified in sanitary surveys performed by EPA as described in subsection 20.24.

20.2 Source water monitoring.

20.2.1 Initial round of source water monitoring. Systems must conduct the following monitoring on the schedule in subsection 20.4 of this section unless they meet the monitoring exemption criteria in subsection 20.2.3.

20.2.1.1 Filtered systems serving at least 10,000 people must sample their source water for Cryptosporidium, E. coli, and turbidity at least monthly for 24 months.

20.2.1.2 Unfiltered systems serving at least 10,000 people must sample their source water for Cryptosporidium at least monthly for 24 months.

20.2.1.3 Filtered Systems

20.2.1.3.1 Filtered systems serving fewer than 10,000 people must sample their source water for E. coli at least once every two weeks for 12 months.

20.2.1.3.2 A filtered system serving fewer than 10,000 people may avoid E. coli monitoring if the system notifies the Division that it will monitor for Cryptosporidium as described in subsection

20.2.1.4. The system must notify the Division no later than 3 months prior to the date the system is otherwise required to start E. coli monitoring under subsection 20.2.3.

20.2.1.4 Filtered systems serving fewer than 10,000 people must sample their source water for Cryptosporidium at least twice per month for 12 months or at least monthly for 24 months if they meet one of the following, based on monitoring conducted under **[subsection]** 20.2.1.3.1:

20.2.1.4.1 For systems using lake/reservoir sources, the annual mean E. coli concentration is greater than 10 E. coli/100 mL.

20.2.1.4.2 For systems using flowing stream sources, the annual mean E. coli concentration is greater than 50 E. coli/100 mL.

20.2.1.4.3 The system does not conduct E. coli monitoring as described in subsection 20.2.1.3.1.

20.2.1.4.4 Systems using ground water under the direct influence of surface water (GWUDI) must comply with the requirements of subsection 20.2.1.4 based on the E. coli level that applies to the nearest surface water body. If no surface water body is nearby, the system must comply based on the requirements that apply to systems using lake/reservoir sources.

20.2.1.5 For filtered systems serving fewer than 10,000 people, the Division may approve monitoring for an indicator other than E. coli under subsections 20.2.1.3.1 and 20.2.1.3.2. The Division also may approve an alternative to the E. coli concentration in subsections 20.2.1.4.1, 20.2.1.4.2 or 20.2.1.4.4 of this section to trigger Cryptosporidium monitoring. This approval by the Division must be provided to the system in writing and must include the basis for the Division's determination that the alternative indicator and/or trigger level will provide a more accurate identification of whether a system will exceed the Bin 1 Cryptosporidium level in subsection 20.11.

20.2.1.6 Unfiltered systems serving fewer than 10,000 people must sample their source water for Cryptosporidium at least twice per month for 12 months or at least monthly for 24 months.

20.2.1.7 Systems may sample more frequently than required under this section if the sampling frequency is evenly spaced throughout the monitoring period.

20.2.2 Second round of source water monitoring. Systems must conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in subsection 20.2.1, unless they meet the monitoring exemption criteria in subsection 20.2.4. Systems must conduct this monitoring on the schedule in subsection 20.2.3.

20.2.3 Monitoring schedule. Systems must begin the monitoring required in subsections 20.2.1 and 20.2.2 no later than the month beginning with the date listed in this table:

Source Water Monitoring Starting Dates Table

Systems that serve	Must begin the first round of source water monitoring no later than the month beginning...	And must begin the second round of source water monitoring no later than the month beginning ...
At least 100,000 people	October 1, 2006	April 1, 2015
From 50,000 to 99,999 people	April 1, 2007	October 1, 2015
From 10,000 to 49,999 people	April 1, 2008	October 1, 2016
Fewer than 10,000 and monitor for E. coli[1]	October 1, 2008	October 1, 2017
Fewer than 10,000 and monitor for Cryptosporidium[2]	April 1, 2010	April 1, 2019

[1]Applies only to filtered systems.

[2]Applies to filtered systems that meet the conditions of subsection 20.2.1.4 and unfiltered systems.

20.2.4 Monitoring avoidance.

20.2.4.1 Filtered systems are not required to conduct source water monitoring under this section if the system will provide a total of at least 5.5-log of treatment for Cryptosporidium, equivalent to meeting the treatment requirements of Bin 4 in subsection 20.12.

20.2.4.2 Unfiltered systems are not required to conduct source water monitoring under this section if the system will provide a total of at least 3-log Cryptosporidium inactivation, equivalent to meeting the

treatment requirements for unfiltered systems with a mean Cryptosporidium concentration of greater than 0.01 oocysts/L in subsection 20.13.

20.2.4.3 If a system chooses to provide the level of treatment in subsections 20.2.4.1 or 20.2.4.2, as applicable, rather than start source water monitoring, the system must notify the Division in writing no later than the date the system is otherwise required to submit a sampling schedule for monitoring under subsection 20.3. Alternatively, a system may choose to stop sampling at any point after it has initiated monitoring if it notifies the Division in writing that it will provide this level of treatment. Systems must install and operate technologies to provide this level of treatment by the applicable treatment compliance date in subsection 20.14.

20.2.5 Plants operating only part of the year. Systems with surface water or ground water under the direct influence of surface water plants that operate for only part of the year must conduct source water monitoring in accordance with this section, but with the following modifications:

20.2.5.1 Systems must sample their source water only during the months that the plant operates unless the Division specifies another monitoring period based on plant operating practices.

20.2.5.2 Systems with plants that operate less than six months per year and that monitor for Cryptosporidium must collect at least six Cryptosporidium samples per year during each of two years of monitoring. Samples must be evenly spaced throughout the period the plant operates.

20.2.6 New sources.

20.2.6.1 A system that begins using a new source of surface water or GWUDI after the system is required to begin monitoring under subsection 20.2.3 must monitor the new source on a schedule the Division approves. Source water monitoring must meet the requirements of this section. The system must also meet the bin classification and Cryptosporidium treatment requirements of subsections 20.11 and 20.12 or subsection 20.13, as applicable, for the new source on a schedule the Division approves.

20.2.6.2 The requirements of subsection 20.2.6 apply to surface water or ground water under the direct influence of surface water systems that begin operation after the monitoring start date applicable to the system's size under **[sub]**section 20.2.3.

20.2.6.3 The system must begin a second round of source water monitoring no later than 6 years following initial bin classification under subsection 20.11 or determination of the mean Cryptosporidium level under subsection 20.13 as applicable.

20.2.7 Failure to collect any source water sample required under this section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory, and reporting requirements of subsections 20.3 through 20.7 is a monitoring violation.

20.2.8 Grandfathering monitoring data. Systems may use (grandfather) monitoring data collected prior to the applicable monitoring start date in subsection 20.2.3 to meet the initial source water monitoring requirements in subsection 20.2.1. Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this paragraph must meet the requirements in subsection 20.8.

20.3 Sampling schedules.

20.3.1 Systems required to conduct source water monitoring under subsection 20.2 must submit a sampling schedule that specifies the calendar dates when the system will collect each required sample.

20.3.1.1 Systems must submit sampling schedules no later than 3 months prior to the applicable date listed in subsection 20.2.3 for each round of required monitoring.

20.3.1.1.1 Systems serving at least 10,000 people must submit their sampling schedule for the initial round of source water monitoring under subsection 20.2.1 to EPA electronically at https://intranet.epa.gov/lt2/.

20.3.1.1.2 If a system is unable to submit the sampling schedule electronically, the system may use an alternative approach for submitting the sampling schedule that EPA approves.

20.3.1.2 Systems serving fewer than 10,000 people must submit their sampling schedules for the initial round of source water monitoring under subsection 20.2.1 to the Division.

20.3.1.3 Systems must submit sampling schedules for the second round of source water monitoring conducted under subsection 20.2.2 to the Division.

20.3.1.4 If EPA or the Division does not respond to a system regarding its sampling schedule, the system must sample at the reported schedule.

20.3.2 Systems must collect samples within two days before or two days after the dates indicated in their sampling schedule (i.e., within a five-day period around the schedule date) unless one of the conditions of subsections 20.3.2.1 or 20.3.2.1.1 applies.

20.3.2.1 If an extreme condition or situation exists that may pose danger to the sample collector, or that cannot be avoided and causes the system to be unable to sample in the scheduled five-day period, the system must sample as close to the scheduled date as is feasible unless the Division approves an alternative sampling date. The system must submit an explanation for the delayed sampling date to the Division concurrent with the shipment of the sample to the laboratory.

20.3.2.1.1 If a system is unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements in subsection 20.5, or the failure of an approved laboratory to analyze the sample, then the system must collect a replacement sample.

20.3.2.1.2 The system must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date unless the system demonstrates that collecting a replacement sample within this time frame is not feasible or the Division approves an alternative resampling date. The system must submit an explanation for the delayed sampling date to the Division concurrent with the shipment of the sample to the laboratory.

20.3.3 Systems that fail to meet the criteria of subsection 20.3.2 of this subsection for any source water sample required under subsection 20.2 must revise their sampling schedules to add dates for collecting all missed samples. Systems must submit the revised schedule to the Division for approval prior to when the system begins collecting the missed samples.

20.4 Sampling locations.

20.4.1 Systems required to conduct source water monitoring under subsection 20.2 must collect samples for each plant that treats a surface water or GWUDI source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the Division may approve one set of monitoring results to be used to satisfy the requirements of subsection 20.2 for all plants.

20.4.2 Source water samples

20.4.2.1 Systems must collect source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants, unless the system meets the condition of subsection 20.4.2.2.

20.4.2.2 The Division may approve a system to collect a source water sample after chemical treatment. To grant this approval, the Division must determine that collecting a sample prior to chemical treatment is not feasible for the system and that the chemical treatment is unlikely to have a significant adverse effect on the analysis of the sample.

20.4.3 Systems that recycle filter backwash water must collect source water samples prior to the point of filter backwash water addition.

20.4.4 Bank filtration.

20.4.4.1 Systems that receive Cryptosporidium treatment credit for bank filtration under subsections 10.4.4 or 10.4.5, as applicable, must collect source water samples in the surface water prior to bank filtration.

20.4.4.2 Systems that use bank filtration as pretreatment to a filtration plant must collect source water samples from the well (i.e., after bank filtration). Use of bank filtration during monitoring must be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive treatment credit for the bank filtration under subsection 20.18.3.

20.4.5 Multiple sources. Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, must collect samples as specified in subsections 20.4.5.1 or 20.4.5.2. The use of multiple sources during monitoring must be consistent with routine operational practice.

20.4.5.1 If a sampling tap is available where the sources are combined prior to treatment, systems must collect samples from the tap.

20.4.5.2 If a sampling tap where the sources are combined prior to treatment is not available, systems must collect samples at each source near the intake on the same day and must follow either subsections 20.4.5.2.1 or 20.4.5.2.2 of this subsection for sample analysis.

20.4.5.2.1 Systems may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.

20.4.5.2.2 Systems may analyze samples from each source separately and calculate a weighted average of the analysis results for each sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source

contributed to total plant flow at the time the sample was collected and then summing these values.

20.4.6 Additional Requirements. Systems must submit a description of their sampling location(s) to the Division at the same time as the sampling schedule required under subsection 20.3. This description must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including pretreatment, points of chemical treatment, and filter backwash recycle. If the Division does not respond to a system regarding sampling location(s), the system must sample at the reported location(s).

20.5 Analytical methods.

20.5.1 Cryptosporidium. Systems must analyze for Cryptosporidium using *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-002* or *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-001*, which are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods online from http://www.epa.gov/safewater/disinfection/lt2 or from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave., NW, Washington, DC 20460 (Telephone: 800-426-4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202-566-2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

20.5.1.1 Systems must analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in subsection 20.5.1. Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters approved by EPA for the methods listed in subsection 20.5.1, up to a packed pellet volume of at least 2 mL.

20.5.1.2 Matrix Spike samples

20.5.1.2.1 Matrix spike (MS) samples, as required by the methods in subsection 20.5.1, must be spiked and filtered by a laboratory approved for Cryptosporidium analysis under subsection 20.5.

20.5.1.2.2 If the volume of the MS sample is greater than 10 L, the system may filter all but 10 L of the MS sample in the field, and ship the filtered sample and the remaining 10 L of source water to the laboratory. In this case, the laboratory must spike the remaining 10 L of water and filter it through the filter used to collect the balance of the sample in the field.

20.5.1.3 Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery (OPR) samples.

20.5.2 E. coli. Systems must use methods for enumeration of E. coli in source water approved in subsection 16.6.

20.5.2.1 The time from sample collection to initiation of analysis may not exceed 30 hours unless the system meets the condition of subsection 20.5.2.2.

20.5.2.2 The Division may approve on a case-by-case basis the holding of an E. coli sample for up to 48 hours between sample collection and initiation of analysis if the Division determines that analyzing an E. coli sample within 30 hours is not feasible. E. coli samples held between 30 to 48 hours must be analyzed by the Colilert reagent version of Standard Method 9223B as listed in subsection 10.6 of this regulation.

20.5.2.3 Systems must maintain samples between 0ºC and 10ºC during storage and transit to the laboratory.

20.5.3 Turbidity. Systems must use methods for turbidity measurement approved in subsection 16.6.

20.6 Approved laboratories.

20.6.1 Cryptosporidium. Systems must have Cryptosporidium samples analyzed by a laboratory that is approved under EPA's Laboratory Quality Assurance Evaluation Program for Analysis of Cryptosporidium in Water or a laboratory that has been certified for Cryptosporidium analysis by an equivalent Division laboratory certification program.

20.6.2 E. coli. Any laboratory certified by the EPA, the National Environmental Laboratory Accreditation Conference or the Division for total coliform or fecal coliform analysis under subsection 16.6 is approved for E. coli analysis under this subsection when the laboratory uses the same technique for E. coli that the laboratory uses for subsection 16.6.

20.6.3 Turbidity. Measurements of turbidity must be made by a party approved by the Division.

20.7 Reporting source water monitoring results.

20.7.1 Systems must report results from the source water monitoring required under subsection 20.2 no later than 10 days after the end of the first month following the month when the sample is collected.

20.7.2 Electronic Reporting

20.7.2.1 All systems serving at least 10,000 people must report the results from the initial source water monitoring required under subsection 20.2.1 to EPA electronically at https://intranet.epa.gov/lt2/.

20.7.2.2 If a system is unable to report monitoring results electronically, the system may use an alternative approach for reporting monitoring results that EPA approves.

20.7.3 Systems serving fewer than 10,000 people must report results from the initial source water monitoring required under subsection 20.2.1 to the Division.

20.7.4 All systems must report results from the second round of source water monitoring required under subsection 20.2.2 to the Division.

20.7.5 Systems must report the applicable information in subsections 20.7.5.1 and 20.7.5.2 for the source water monitoring required under section 20.2.

20.7.5.1 Systems must report the following data elements for each Cryptosporidium analysis:

Data element

PWS ID.

Facility ID.

Sample collection date.

Sample type (field or matrix spike).

Sample volume filtered (L), to nearest 1/4\ L.

Was 100% of filtered volume examined.

Number of oocysts counted.

20.7.5.1.1 For matrix spike samples, systems must also report the sample volume spiked and estimated number of oocysts spiked. These data are not required for field samples.

20.7.5.1.2 For samples in which less than 10 L is filtered or less than 100% of the sample volume is examined, systems must also report the number of filters used and the packed pellet volume.

20.7.5.1.3 For samples in which less than 100% of sample volume is examined, systems must also report the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.

20.7.5.2 Systems must report the following data elements for each E. coli analysis:

Data element

PWS ID.

Facility ID.

Sample collection date.

Analytical method number.

Method type.

Source type (flowing stream, lake/reservoir, GWUDI).

E. coli/100 mL.

Turbidity.[1]

[1] Systems serving fewer than 10,000 people that are not required to monitor for turbidity under **[sub]**section 20.2 are not required to report turbidity with their E. coli results.

20.8 Grandfathering previously collected data.

20.8.1 Grandfathering

20.8.1.1 Systems may comply with the initial source water monitoring requirements of subsection 20.2.1 by grandfathering sample results collected before the system is required to begin monitoring (i.e., previously collected data). To be grandfathered, the sample results and analysis must meet the criteria in this section and the Division must approve.

20.8.1.2 A filtered system may grandfather Cryptosporidium samples to meet the requirements of subsection 20.2.1 when the system does not have corresponding E. coli and turbidity samples. A system that grandfathers Cryptosporidium samples without E. coli and turbidity samples is not required to collect E. coli and turbidity samples when the system completes the requirements for Cryptosporidium monitoring under **[sub]**section 20.2.1.

20.8.2 E. coli sample analysis. The analysis of E. coli samples must meet the analytical method and approved laboratory requirements of subsections 20.5 through 20.6.

20.8.3 Cryptosporidium sample analysis. The analysis of Cryptosporidium samples must meet the criteria in this paragraph.

20.8.3.1 Laboratories analyzed Cryptosporidium samples using one of the analytical methods in subsections 20.8.3.1.1 through 20.8.3.1.6, which are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of these methods on-line from the United States Environmental Protection Agency, Office of Ground Water and Drinking Water, 1201 Constitution Ave, NW, Washington, DC 20460 (Telephone: 800-426-4791). You may inspect a copy at the Water Docket in the EPA Docket Center, 1301 Constitution Ave., NW, Washington, DC, (Telephone: 202-566-2426) or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code--of--federal--regulations/ibr--locations.html.

20.8.3.1.1 *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-002.*

20.8.3.1.2 *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 2005, United States Environmental Protection Agency, EPA-815-R-05-001.*

20.8.3.1.3 *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, 2001, United States Environmental Protection Agency, EPA-821-R-01-025.*

20.8.3.1.4 *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 2001, United States Environmental Protection Agency, EPA-821--R-01-026.*

20.8.3.1.5 *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, 1999, United States Environmental Protection Agency, EPA-821-R-99-006.*

20.8.3.1.6 *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 1999, United States Environmental Protection Agency, EPA-821-R-99-001.*

20.8.3.2 For each Cryptosporidium sample, the laboratory analyzed at least 10 L of sample or at least 2 mL of packed pellet or as much volume as could be filtered by 2 filters that EPA approved for the methods listed in subsection 20.8.3.1.

20.8.4 Sampling location. The sampling location must meet the conditions in subsection 20.4.

20.8.5 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 subsections 20.3.2.1 and 20.3.2.2 if the system provides documentation of the condition when reporting monitoring results.

20.8.5.1 The Division may approve grandfathering of previously collected data where there are time gaps in the sampling frequency if the system conducts additional monitoring the Division specifies to ensure that the data used to comply with the initial source water monitoring requirements of subsection 20.2.1 are seasonally representative and unbiased.

20.8.5.2 Systems may grandfather previously collected data where the sampling frequency within each month varied. If the Cryptosporidium sampling frequency varied, systems must follow the monthly averaging procedure in subsections 20.11.2.5 or 20.13.1.3, as applicable, when calculating the bin classification for filtered systems or the mean Cryptosporidium concentration for unfiltered systems.

20.8.6 Reporting monitoring results for grandfathering. Systems that request to grandfather previously collected monitoring results must report the following information by the applicable dates listed in this paragraph. Systems serving at least 10,000 people must report this information to EPA unless the Division approves reporting to the Division rather than EPA. Systems serving fewer than 10,000 people must report this information to the Division.

20.8.6.1 Systems must report that they intend to submit previously collected monitoring results for grandfathering. This report must specify the number of previously collected results the system will submit, the dates of the first and last sample, and whether a system will conduct additional source water monitoring to meet the requirements of subsection 20.2.1. Systems must report this information no later than the date the sampling schedule under subsection 20.3 is required.

20.8.6.2 Systems must report previously collected monitoring results for grandfathering, along with the associated documentation listed in subsections 20.8.6.2.1 through 20.8.6.2.4, no later than two months after the applicable date listed in **[sub]**section 20.2.3.

20.8.6.2.1 For each sample result, systems must report the applicable data elements in subsection 20.8.

20.8.6.2.2 Systems must certify that the reported monitoring results include all results the system generated during the time period beginning with the first reported result and ending with the

final reported result. This applies to samples that were collected from the sampling location specified for source water monitoring under this section, not spiked, and analyzed using the laboratory's routine process for the analytical methods listed in this section.

20.8.6.2.3 Systems must certify that the samples were representative of a plant's source water(s) and the source water(s) have not changed. Systems must report a description of the sampling location(s), which must address the position of the sampling location in relation to the system's water source(s) and treatment processes, including points of chemical addition and filter backwash recycle.

20.8.6.2.4 For Cryptosporidium samples, the laboratory or laboratories that analyzed the samples must provide a letter certifying that the quality control criteria specified in the methods listed in subsection 20.8.3.1 were met for each sample batch associated with the reported results. Alternatively, the laboratory may provide bench sheets and sample examination report forms for each field, matrix spike, IPR, OPR, and method blank sample associated with the reported results.

20.8.7 If the Division determines that a previously collected data set submitted for grandfathering was generated during source water conditions that were not normal for the system, such as a drought, the Division may disapprove the data. Alternatively, the Division may approve the previously collected data if the system reports additional source water monitoring data, as determined by the Division, to ensure that the data set used under subsections 20.11 or 20.13 represents average source water conditions for the system.

20.8.8 If a system submits previously collected data that fully meet the number of samples required for initial source water monitoring under subsection 20.2.1 and some of the data are rejected due to not meeting the requirements of this section, systems must conduct additional monitoring to replace rejected data on a schedule the Division approves. Systems are not required to begin this additional monitoring until two months after notification that data have been rejected and additional monitoring is necessary.

20.9 Requirements when making a significant change in disinfection practice.

20.9.1 Following the completion of initial source water monitoring under subsection 20.2.1, a system that plans to make a significant change to its disinfection practice, as defined in subsection 20.9.2, must develop disinfection profiles and calculate disinfection benchmarks for Giardia lamblia and viruses as described in subsection 20.10. Prior to changing the disinfection practice, the system must notify the Division and must include in this notice the information in subsections 20.9.1.1 through 20.9.1.3.

20.9.1.1 A completed disinfection profile and disinfection benchmark for Giardia lamblia and viruses as described in subsection 20.10.

20.9.1.2 A description of the proposed change in disinfection practice.

20.9.1.3 An analysis of how the proposed change will affect the current level of disinfection.

20.9.2 Significant changes to disinfection practice are defined as follows:

20.9.2.1 Changes to the point of disinfection;

20.9.2.2 Changes to the disinfectant(s) used in the treatment plant;

20.9.2.3 Changes to the disinfection process; or

20.9.2.4 Any other modification identified by the Division as a significant change to disinfection practice.

20.10 Developing the disinfection profile and benchmark

20.10.1 Systems required to develop disinfection profiles under subsection 20.9 must follow the requirements of this section. Systems must monitor at least weekly for a period of 12 consecutive months to determine the total log inactivation for Giardia lamblia and viruses. If systems monitor more frequently, the monitoring frequency must be evenly spaced. Systems that operate for fewer than 12 months per year must monitor weekly during the period of operation. Systems must determine log inactivation for Giardia lamblia through the entire plant, based on $CT_{99.9}$ values in Tables 1.1 through 1.6, 2.1 and 3.1 of **[40]** CFR §141.74(b) as applicable. Copies are available from the Office of Drinking Water upon request. Systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the Division.

20.10.2 Systems with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in subsections 20.10.2.1 through 20.10.2.4. Systems with more than one point of disinfectant application must conduct the monitoring in subsections 20.10.2.1 through 20.10.2.4 for each disinfection segment. Systems must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in subsection 16.6.

20.10.2.1 For systems using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the Division.

20.10.2.2 For systems using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the Division.

20.10.2.3 The disinfectant contact time(s) (t) must be determined during peak hourly flow.

20.10.2.4 The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfectant application must be measured during peak hourly flow.

20.10.3 In lieu of conducting new monitoring under subsection 20.10.2, systems may elect to meet the requirements of subsection 20.10.3.1 or 20.10.3.2 of this section.

20.10.3.1 Systems that have at least one year of existing data that are substantially equivalent to data collected under the provisions of subsection 20.10.2 may use these data to develop disinfection profiles as specified in this section if the system has neither made a significant change to its treatment practice nor changed sources since the data were collected. Systems may develop disinfection profiles using up to three years of existing data.

20.10.3.2 Systems may use disinfection profile(s) developed under subsection 17.5 or Subpart H systems serving fewer than 10,000 people may use disinfection profiles developed under subsection 19.1 in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Systems that have not developed a virus profile under subsection 17.5 or Subpart H systems serving fewer than 10,000 people under subsection 19.1 must develop a virus profile using the same monitoring data on which the Giardia lamblia profile is based.

20.10.4 Systems must calculate the total inactivation ratio for Giardia lamblia as specified in subsections 20.10.4.1 through 20.10.4.3.

20.10.4.1 Systems using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the methods in subsection 20.10.4.1.1 or 20.10.4.1.2.

20.10.4.1.1 Determine one inactivation ratio (CTcalc/CT99.9) before or at the first customer during peak hourly flow.

20.10.4.1.2 Determine successive CTcalc/CT99.9 values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The system must calculate the total inactivation ratio by determining (CTcalc/CT99.9) for each sequence and then adding the (CTcalc/CT99.9) values together to determine (∑(CTcalc/CT99.9)).

20.10.4.2 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/CT99.9) value of each segment and (∑(CTcalc/CT99.9)) must be calculated using the method in subsection 20.10.4.1.2.

20.10.4.3 The system must determine the total logs of inactivation by multiplying the value calculated in subsections 20.10.4.1 or 20.10.4.2 by 3.0.

20.10.4.4 Systems must calculate the log of inactivation for viruses using a protocol approved by the Division.

20.10.5 Systems must use the procedures specified in subsections 20.10.5.1 and 20.10.5.2 to calculate a disinfection benchmark.

20.10.5.1 For each year of profiling data collected and calculated under subsections 20.10.1 through 20.10.4, systems must determine the lowest mean monthly level of both Giardia lamblia and virus inactivation. Systems must determine the mean Giardia lamblia and virus inactivation for each calendar month for each year of profiling data by dividing the sum of daily or weekly Giardia lamblia and virus log inactivation by the number of values calculated for that month.

20.10.5.2 The disinfection benchmark is the lowest monthly mean value (for systems with one year of profiling data) or the mean of the lowest monthly mean values (for systems with more than one year of profiling data) of Giardia lamblia and virus log inactivation in each year of profiling data.

20.11 Bin classification for filtered systems

20.11.1 Following completion of the initial round of source water monitoring required under subsection 20.2.1, filtered systems must calculate an initial Cryptosporidium bin concentration for each plant for which monitoring was required. Calculation of the bin concentration must use the Cryptosporidium results reported under **[sub]**section 20.2.1 and must follow the procedures in subsections 20.11.2.1 through 20.11.2.5.

20.11.2 Bin classification

20.11.2.1 For systems that collect a total of at least 48 samples, the bin concentration is equal to the arithmetic mean of all sample concentrations.

20.11.2.2 For systems that collect a total of at least 24 samples, but not more than 47 samples, the bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which Cryptosporidium samples were collected.

20.11.2.3 For systems that serve fewer than 10,000 people and monitor for Cryptosporidium for only one year (i.e., collect 24 samples in 12 months), the bin concentration is equal to the arithmetic mean of all sample concentrations.

20.11.2.4 For systems with plants operating only part of the year that monitor fewer than 12 months per year under subsection 20.2.5, the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of Cryptosporidium monitoring.

20.11.2.5 If the monthly Cryptosporidium sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in subsections 20.11.2.1 through 20.11.2.4.

20.11.3 Filtered systems must determine their initial bin classification from the following table and using the Cryptosporidium bin concentration calculated under subsections 20.11.1 and 20.11.2:

Bin Classification Table for Filtered Systems

For systems that are:	With a Cryptosporidium bin concentration of…[1]	The bin classification is…
…required to monitor for Cryptosporidium under **[sub]**section 20.2	Cryptosporidium <0.075 oocyst/L.	Bin 1.
	0.075 oocysts/L ≤Cryptosporidium < 1.0 oocysts/L.	Bin 2.
	1.0 oocysts/L ≤Cryptosporidium <3.0 oocysts/L	Bin 3.
	Cryptosporidium ≥3.0 oocysts/ L	Bin 4.
…serving fewer than 10,000 people and NOT required to monitor for Cryptosporidium under **[sub]**section 20.2.1.4	N/A	Bin 1.

[1] Based on calculations in subsection 20.11.1 or 20.11.4, as applicable.

20.11.4 Following completion of the second round of source water monitoring required under subsection 20.2.2, filtered systems must recalculate their Cryptosporidium bin concentration using the Cryptosporidium results reported under subsection 20.2.2 and following the procedures in **[sub]**sections 20.11.2.1 through 20.11.2.4. Systems must then re-determine their bin classification using this bin concentration and the table in **[subsection]** 20.11.3.

20.11.5 Reporting bin classification

20.11.5.1 Filtered systems must report their initial bin classification under subsection 20.11.3 to the Division for approval no later than 6 months after the system is required to complete initial source water monitoring based on the schedule in **[sub]**section 20.3.

20.11.5.2 Systems must report their bin classification under subsection 20.11.4 to the Division for approval no later than 6 months after the system is required to complete the second round of source water monitoring based on the schedule in subsection 20.2.3.

20.11.5.3 The bin classification report to the Division must include a summary of source water monitoring data and the calculation procedure used to determine bin classification.

20.11.6 Failure to comply with the conditions of subsection 20.11.5 is a violation of the treatment technique requirement.

20.12 Filtered system additional Cryptosporidium treatment requirements

20.12.1 Filtered systems must provide the level of additional treatment for Cryptosporidium specified in this paragraph based on their bin classification as determined under subsection 20.11 and according to the schedule in subsection 20.14.

If the system bin classification is…	And the system uses the following filtration treatment in full compliance with Sections 16.0, 17.0 and 19.0 (as applicable), then the additional Cryptosporidium treatment requirements are…			
	Conventional filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration	Alternative filtration technologies
Bin 1…	No additional treatment…	No additional treatment…	No additional treatment…	No additional Treatment
Bin 2…	1-log treatment…	1.5-log treatment…	1-log treatment…	([1])
Bin 3…	2-log treatment…	2.5-log treatment…	2-log treatment…	([2])
Bin 4…	2.5-log treatment…	3-log treatment…	2.5-log treatment…	([3])

[1] As determined by the Division such that the total Cryptosporidium removal and inactivation is at least 4.0-log.

[2] As determined by the Division such that the total Cryptosporidium removal and inactivation is at least 5.0-log.

[3] As determined by the Division such that the total Cryptosporidium removal and inactivation is at least 5.5-log.

20.12.2 Treatment options

20.12.2.1 Filtered systems must use one or more of the treatment and management options listed in subsection 20.16, termed the microbial toolbox, to comply with the additional Cryptosporidium treatment required in subsection 20.12.1.

20.12.2.2 Systems classified in Bin 3 and Bin 4 must achieve at least 1-log of the additional Cryptosporidium treatment required under subsection 20.12.1 using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or UV, as described in subsections 20.17 through 20.21.

20.12.3 Failure by a system in any month to achieve treatment credit by meeting criteria in subsections 20.17 through 20.21 for microbial toolbox options that is at least equal to the level of treatment required in subsection 20.12.1 is a violation of the treatment technique requirement.

20.12.4 If the Division determines during a sanitary survey or an equivalent source water assessment that after a system completed the monitoring conducted under subsection 20.2.1 or subsection 20.2.2, significant changes occurred in the system's watershed that could lead to increased contamination of the source water by Cryptosporidium, the system must take actions specified by the Division to address the contamination. These actions may include additional source water monitoring and/or implementing microbial toolbox options listed in subsection 20.16.

20.13 Unfiltered system Cryptosporidium treatment requirements

20.13.1 Determination of mean Cryptosporidium level.

20.13.1.1 Following completion of the initial source water monitoring required under subsection 20.2.1, unfiltered systems must calculate the arithmetic mean of all Cryptosporidium sample concentrations reported under subsection 20.2.1. Systems must report this value to the Division for approval no later than 6 months after the month the system is required to complete initial source water monitoring based on the schedule in subsection 20.2.3.

20.13.1.2 Following completion of the second round of source water monitoring required under subsection 20.2.2, unfiltered systems must calculate the arithmetic mean of all Cryptosporidium sample

concentrations reported under subsection 20.2.2. Systems must report this value to the Division for approval no later than 6 months after the month the system is required to complete the second round of source water monitoring based on the schedule in subsection 20.1.3.

20.13.1.3 If the monthly Cryptosporidium sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the calculation of the mean Cryptosporidium level in subsections 20.13.1.1 or 20.13.1.2.

20.13.1.4 The report to the Division of the mean Cryptosporidium levels calculated under subsections 20.13.1.1 and 20.13.1.2 must include a summary of the source water monitoring data used for the calculation.

20.13.1.5 Failure to comply with the conditions of subsection 20.13.1 is a violation of the treatment technique requirement.

20.13.2 Cryptosporidium inactivation requirements. Unfiltered systems must provide the level of inactivation for Cryptosporidium specified in this paragraph, based on their mean Cryptosporidium levels as determined under subsection 20.13.1 and according to the schedule in subsection 20.14.

20.13.2.1 Unfiltered systems with a mean Cryptosporidium level of 0.01 oocysts/L or less must provide at least 2-log Cryptosporidium inactivation.

20.13.2.2 Unfiltered systems with a mean Cryptosporidium level of greater than 0.01 oocysts/L must provide at least 3-log Cryptosporidium inactivation.

20.13.3 Inactivation treatment technology requirements. Unfiltered systems must use chlorine dioxide, ozone, or UV as described in subsection 20.21 to meet the Cryptosporidium inactivation requirements of this section.

20.13.3.1 Systems that use chlorine dioxide or ozone and fail to achieve the Cryptosporidium inactivation required in subsection 20.13.2 on more than one day in the calendar month are in violation of the treatment technique requirement.

20.13.3.2 Systems that use UV light and fail to achieve the Cryptosporidium inactivation required in **[sub]**section 20.13.2 by meeting the criteria in subsection 20.21.4.2 are in violation of the treatment technique requirement.

20.13.4 Use of two disinfectants. Unfiltered systems must meet the combined Cryptosporidium inactivation requirements of this section and Giardia lamblia and virus inactivation requirements of section 16.3 using a minimum of two disinfectants, and each of two disinfectants must separately achieve the total inactivation required for either Cryptosporidium, Giardia lamblia, or viruses. Note: these regulations prohibit unfiltered surface water systems.

20.14 Schedule for compliance with Cryptosporidium treatment requirements

20.14.1 Following initial bin classification under subsection 20.11.3, filtered systems must provide the level of treatment for Cryptosporidium required under **[sub]**section 20.12 according to the schedule in subsection 20.14.3.

20.14.2 Following initial determination of the mean Cryptosporidium level under subsection 20.13.1.1, unfiltered systems must provide the level of treatment for Cryptosporidium required under subsection 20.13 according to the schedule in subsection 20.14.3.

20.14.3 Cryptosporidium treatment compliance dates.

Cryptosporidium Treatment Compliance Dates Table

Systems that serve…	Must comply with Cryptosporidium treatment requirements no later than…[1]
(1) at least 100,000 people	(i) April 1, 2012
(2) From 50,000 to 99,999 people	(i) October 1, 2012
(3) From 10,000 to 49,999 people	(i) October 1, 2013
(4) Fewer than 10,000 people	(i) October 1, 2014

[1] The Division may allow up to an additional two years for complying with the treatment requirement for systems making capital improvements.

20.14.4 If the bin classification for a filtered system changes following the second round of source water monitoring, as determined under subsection 20.11.4, the system must provide the level of treatment for Cryptosporidium required under subsection 20.12 on a schedule the Division approves.

20.14.5 If the mean Cryptosporidium level for an unfiltered system changes following the second round of monitoring, as determined under subsection 20.13.1.2, and if the system must provide a different level of Cryptosporidium treatment under subsection 20.13 due to this change, the system must meet this treatment requirement on a schedule the Division approves.

20.15 Requirements for uncovered finished water storage facilities

20.15.1 Systems using uncovered finished water storage facilities must comply with the conditions of this section.

20.15.2 Systems must notify the Division of the use of each uncovered finished water storage facility no later than April 1, 2008.

20.15.3 Systems must meet the conditions of subsections 20.15.3.1 or 20.15.3.2 for each uncovered finished water storage facility or be in compliance with a Division-approved schedule to meet these conditions no later than April 1, 2009.

20.15.3.1 Systems must cover any uncovered finished water storage facility.

20.15.3.2 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 Division.

20.15.4 Failure to comply with the requirements of this section is a violation of the treatment technique requirement.

20.16 Microbial toolbox options for meeting Cryptosporidium treatment requirements.

20.16.1 Treatment credits

20.16.1.1 Systems receive the treatment credits listed in the table in subsection 20.16.2 by meeting the conditions for microbial toolbox options described in subsections 20.17 through 20.21. Systems apply these treatment credits to meet the treatment requirements in subsections 20.12 or 20.13, as applicable.

20.16.1.2 Unfiltered systems are eligible for treatment credits for the microbial toolbox options described in subsection 20.21 only.

20.16.2 The following table summarizes options, treatment credits, and criteria in the microbial toolbox:

Microbial Toolbox Summary Table: Options, Treatment Credits and Criteria

Toolbox Option	Cryptosporidium Treatment credit with design and implementation criteria
Source Protection and Management Toolbox Options	
(1) Watershed control program	0.5-log credit for Division-approved program comprising required elements, annual program status report to Division, and regular watershed survey. Unfiltered systems are not eligible for credit. Specific criteria are in subsection 20.17.1.
(2) Alternative source/intake management	No prescribed credit. Systems may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria are in **[subsection]** 20.17.2.
Pre-Filtration Toolbox Options	
(3) Presedimentation basin with coagulation	0.5-log credit during any month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative Division-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through the basins. Specific criteria are in subsection 20.18.1.
(4) Two-stage lime softening	0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow must pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria are in subsection 20.18.2.

(5) Bank filtration	0.5-log credit for 25 foot setback; 1.0-log credit for 50 foot setback; aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU. Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit. Specific criteria are in subsection 20.18.3.
Treatment Performance Toolbox Options	
(6) Combined filter performance	0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria are in subsection 20.19.1.
(7) Individual filter performance	0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria are in subsection 20.19.2.
(8) Demonstration of performance	Credit awarded to unit process or treatment train based on a demonstration to the Division with a Division-approved protocol. Specific criteria are in subsection 20.19.3.
Additional Filtration Toolbox Options	
(9) Bag or cartridge filters (individual filters)	Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1-log factor of safety. Specific criteria are in subsection 20.20.1.
(10) Bag or cartridge filter (in series)	Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria are in subsection 20.20.1.
(11) Membrane filtration	Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria are in subsection 20.20.2.
(12) Second stage filtration	0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation prior to first filter. Specific criteria are in subsection 20.20.3.
(13) Slow sand filters	2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria are in subsection 20.20.4.
Inactivation Toolbox Options	
(14) Chlorine dioxide	Log credit based on measured CT in relation to CT table. Specific criteria are in subsection 20.21.2.
(15) Ozone	Log credit based on measured CT in relation to CT table. Specific criteria are in subsection 20.21.2.
(16) UV	Log credit based on validated UV dose in relation to UV dose table; reactor validation testing required to establish UV dose and associated operating conditions. Specific criteria are in subsection 20.21.4.

20.17 Source toolbox components

20.17.1 Watershed control program. Systems receive 0.5-log Cryptosporidium treatment credit for implementing a watershed control program that meets the requirements of this section.

20.17.1.1 Systems that intend to apply for the watershed control program credit must notify the Division of this intent no later than two years prior to the treatment compliance date applicable to the system in subsection 20.14.

20.17.1.2 Systems must submit to the Division a proposed watershed control plan no later than one year before the applicable treatment compliance date in subsection 20.14. The Division must approve

the watershed control plan for the system to receive watershed control program treatment credit. The watershed control plan must include the elements in subsections 20.17.1.2.1 through 20.17.1.2.4.

20.17.1.2.1 Identification of an “area of influence” outside of which the likelihood of Cryptosporidium or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys under subsection 20.17.1.5.2.

20.17.1.2.2 Identification of both potential and actual sources of Cryptosporidium contamination and an assessment of the relative impact of these sources on the system's source water quality.

20.17.1.2.3 An analysis of the effectiveness and feasibility of control measures that could reduce Cryptosporidium loading from sources of contamination to the system's source water.

20.17.1.2.4 A statement of goals and specific actions the system will undertake to reduce source water Cryptosporidium levels. The plan must explain how the actions are expected to contribute to specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.

20.17.1.3 Systems with existing watershed control programs (i.e., programs in place on January 5, 2006) are eligible to seek this credit. Their watershed control plans must meet the criteria in subsection 20.17.1.2 and must specify ongoing and future actions that will reduce source water Cryptosporidium levels.

20.17.1.4 If the Division does not respond to a system regarding approval of a watershed control plan submitted under this section and the system meets the other requirements of this section, the watershed control program will be considered approved and 0.5 log Cryptosporidium treatment credit will be awarded unless and until the Division subsequently withdraws such approval.

20.17.1.5 Systems must complete the actions in subsections 20.17.1.5.1 through 20.17.1.5.3 to maintain the 0.5-log credit.

20.17.1.5.1 Submit an annual watershed control program status report to the Division. The annual watershed control program status report must describe the system's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the Division or as the result of the watershed survey conducted under subsection 20.17.1.5.2. It must also describe any significant changes that have occurred in the watershed since the last watershed sanitary survey. If a system determines during implementation that making a significant change to its approved watershed control program is necessary, the system must notify the Division prior to making any such changes. If any change is likely to reduce the level of source water protection, the system must also list in its notification the actions the system will take to mitigate this effect.

20.17.1.5.2 Undergo a watershed sanitary survey every three years for community water systems and every five years for non-community water systems and submit the survey report to the Division. The survey must be conducted according to Division guidelines and by persons the Division approves.

20.17.1.5.2.1 The watershed sanitary survey must meet the following criteria: encompass the region identified in the Division-approved watershed control plan as the area of influence; assess the implementation of actions to reduce source water Cryptosporidium levels; and identify any significant new sources of Cryptosporidium.

20.17.1.5.2.2 If the Division determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, systems must undergo another watershed sanitary survey by a date the Division requires, which may be earlier than the regular date in subsection 20.17.1.5.2.

20.17.1.5.3 The system must make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon request. These documents must be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The Division may approve systems to withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.

20.17.1.6 If the Division determines that a system is not carrying out the approved watershed control plan, the Division may withdraw the watershed control program treatment credit.

20.17.2 Alternative source.

20.17.2.1 A system may conduct source water monitoring that reflects a different intake location (either in the same source or for an alternate source) or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the Division approves, a system may determine its bin classification under subsection 20.11 based on the alternative source monitoring results.

20.17.2.2 If systems conduct alternative source monitoring under subsection 20.17.2.1, systems must also monitor their current plant intake concurrently as described in subsection 20.2.

20.17.2.3 Alternative source monitoring under subsection 20.17.2.1 must meet the requirements for source monitoring to determine bin classification, as described in subsections 20.2 through 20.7. Systems must report the alternative source monitoring results to the Division, along with supporting information documenting the operating conditions under which the samples were collected.

20.17.2.4 If a system determines its bin classification under subsection 20.11 using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the system must relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in subsection 20.14.

20.18 Pre-filtration treatment toolbox components

20.18.1 Presedimentation. Systems receive 0.5-log Cryptosporidium treatment credit for a presedimentation basin during any month the process meets the criteria in this paragraph.

20.18.1.1 The presedimentation basin must be in continuous operation and must treat the entire plant flow taken from a surface water or GWUDI source.

20.18.1.2 The system must continuously add a coagulant to the presedimentation basin.

20.18.1.3 The presedimentation basin must achieve the performance criteria in subsections 20.18.1.3.1 or 20.18.1.3.2.

20.18.1.3.1 Demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent and must be calculated as follows: $\log_{10}$ (monthly mean of daily influent turbidity)-$\log_{10}$ (monthly mean of daily effluent turbidity).

20.18.1.3.2 Complies with Division-approved performance criteria that demonstrate at least 0.5-log mean removal of micron-sized particulate material through the presedimentation process.

20.18.2 Two-stage lime softening. Systems receive an additional 0.5-log Cryptosporidium treatment credit for a two-stage lime softening plant if chemical addition and hardness precipitation occur in two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or GWUDI source.

20.18.3 Bank filtration. Systems receive Cryptosporidium treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this paragraph. Systems using bank filtration when they begin source water monitoring under subsection 20.2.1 must collect samples as described in subsection 20.4.4 and are not eligible for this credit.

20.18.3.1 Wells with a ground water flow path of at least 25 feet receive 0.5-log treatment credit; wells with a ground water flow path of at least 50 feet receive 1.0-log treatment credit. The ground water flow path must be determined as specified in subsection 20.18.3.4.

20.18.3.2 Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. A system must characterize the aquifer at the well site to determine aquifer properties. Systems must extract a core from the aquifer and demonstrate that in at least 90 percent of the core length, grains less than 1.0 mm in diameter constitute at least 10 percent of the core material.

20.18.3.3 Only horizontal and vertical wells are eligible for treatment credit.

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

20.18.3.5 Systems must monitor each wellhead for turbidity at least once every four hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the system must report this result to the Division and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the

Division determines that microbial removal has been compromised, the Division may revoke treatment credit until the system implements corrective actions approved by the Division to remediate the problem.

20.18.3.6 Springs and infiltration galleries are not eligible for treatment credit under this subsection, but are eligible for credit under subsection 20.19.3.

20.18.3.7 Bank filtration demonstration of performance. The Division may approve Cryptosporidium treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in subsections 20.18.3.1 through 20.18.3.5.

20.18.3.7.1 The study must follow a Division-approved protocol and must involve the collection of data on the removal of Cryptosporidium or a surrogate for Cryptosporidium and related hydrogeologic and water quality parameters during the full range of operating conditions.

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

20.19 Treatment performance toolbox components

20.19.1 Combined filter performance. Systems using conventional filtration treatment or direct filtration treatment receive an additional 0.5-log Cryptosporidium treatment credit during any month the system meets the criteria in this paragraph. Combined filter effluent (CFE) turbidity must be less than or equal to 0.15 NTU in at least 95 percent of the measurements. Turbidity must be measured as described in subsections 16.5.1.

20.19.2 Individual filter performance. Systems using conventional filtration treatment or direct filtration treatment receive 0.5-log Cryptosporidium treatment credit, which can be in addition to the 0.5-log credit under subsection 20.19.1, during any month the system meets the criteria in this paragraph. Compliance with these criteria must be based on individual filter turbidity monitoring as described in subsection 10.10 or **[40]** CFR section 141.560 (Copy available at the Office of Drinking Water as applicable).

20.19.2.1 The filtered water turbidity for each individual filter must be less than or equal to 0.15 NTU in at least 95 percent of the measurements recorded each month.

20.19.2.2 No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.

20.19.2.3 Any system that has received treatment credit for individual filter performance and fails to meet the requirements of subsections 20.19.2.1 or 20.19.2.2 during any month does not receive a treatment technique violation under subsection 20.12.3 if the Division determines the following:

20.19.2.3.1 The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance.

20.19.2.3.2 The system has experienced no more than two such failures in any calendar year.

20.19.3 Demonstration of performance. The Division may approve Cryptosporidium treatment credit for drinking water treatment processes based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than or less than the prescribed treatment credits in subsection 20.12 or subsections 20.18 through 20.21 and may be awarded to treatment processes that do not meet the criteria for the prescribed credits.

20.19.3.1 Systems cannot receive the prescribed treatment credit for any toolbox box option in subsections 20.18 through 20.21 if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under this paragraph.

20.19.3.2 The demonstration of performance study must follow a Division-approved protocol and must demonstrate the level of Cryptosporidium reduction the treatment process will achieve under the full range of expected operating conditions for the system.

20.19.3.3 Approval by the Division must be in writing and may include monitoring and treatment performance criteria that the system must demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The Division may designate such criteria where necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

20.20 Additional filtration toolbox components

20.20.1 Bag and cartridge filters. Systems receive Cryptosporidium treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series by meeting the criteria in subsections 20.20.1.1 through 20.20.1.10. To be eligible for this credit, systems must report the results of challenge testing that meets the requirements of subsections 20.20.1.2 through 20.20.1.9 to the

Division. The filters must treat the entire plant flow taken from a surface water or ground water under the direct influence of surface water source.

20.20.1.1 The Cryptosporidium treatment credit awarded to bag or cartridge filters must be based on the removal efficiency demonstrated during challenge testing that is conducted according to the criteria in subsections 20.20.1.2 through 20.20.1.9. A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series must be applied to challenge testing results to determine removal credit. Systems may use results from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria specified in subsections 20.20.1.2 through 20.20.1.9.

20.20.1.2 Challenge testing must be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the system will use for removal of Cryptosporidium. Bag or cartridge filters must be challenge tested in the same configuration that the system will use, either as individual filters or as a series configuration of filters.

20.20.1.3 Challenge testing must be conducted using Cryptosporidium or a surrogate that is removed no more efficiently than Cryptosporidium. The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discreetly quantifying the specific microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.

20.20.1.4 The maximum feed water concentration that can be used during a challenge test must be based on the detection limit of the challenge particulate in the filtrate (i.e., filtrate detection limit) and must be calculated using the following equation:

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

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

20.20.1.6 Each filter evaluated must be tested for a duration sufficient to reach 100 percent of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of this section.

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

$$LRV = LOG10(Cf) - LOG10(Cp)$$

Where:

LRV = log removal value demonstrated during challenge testing;

Cf = the feed concentration measured during the challenge test; and

Cp = the filtrate concentration measured during the challenge test.

20.20.1.7.1 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 Cp must be set equal to the detection limit.

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

20.20.1.9 If fewer than 20 filters are tested, the overall removal efficiency for the filter product line must be set equal to the lowest LRVfilter among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line must be set equal to the 10th percentile of the set of LRVfilter values for the various filters tested. The percentile is defined by (i/(n+1)) where i is the rank of an individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

20.20.1.10 If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted to the Division.

20.20.2 Membrane filtration.

20.20.2.1 Systems receive Cryptosporidium treatment credit for membrane filtration that meets the criteria of this paragraph. Membrane cartridge filters that meet the definition of membrane filtration in Section

2.0 are eligible for this credit. The level of treatment credit a system receives is equal to the lower of the values determined under subsections 20.20.2.1.1 and 20.20.2.1.2.

20.20.2.1.1 The removal efficiency demonstrated during challenge testing conducted under the conditions in subsection 20.20.2.2.

20.20.2.1.2 The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in subsection 20.20.2.3.

20.20.2.2 Challenge Testing. The membrane used by the system must undergo challenge testing to evaluate removal efficiency, and the system must report the results of challenge testing to the Division. Challenge testing must be conducted according to the criteria in subsections 20.20.2.2.1 through 20.20.2.2.7. Systems may use data from challenge testing conducted prior to January 5, 2006 if the prior testing was consistent with the criteria in subsections 20.20.2.2.1 through 20.20.2.2.7.

20.20.2.2.1 Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

20.20.2.2.2 Challenge testing must be conducted using Cryptosporidium oocysts or a surrogate that is removed no more efficiently than Cryptosporidium oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.

20.20.2.2.3 The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation:

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

20.20.2.2.4 Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric percent of feed water that is converted to filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process (i.e., backwashing).

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

$$LRV = LOG_{10}(C_f) - LOG_{10}(C_p)$$

Where:

LRV = log removal value demonstrated during the challenge test;

C_f = the feed concentration measured during the challenge test; and

C_p = the filtrate concentration measured during the challenge test.

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

20.20.2.2.6 The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ($LRV_{C\text{-}Test}$). If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then $LRV_{C\text{-}Test}$ is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

20.20.2.2.7 The challenge test must establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the Cryptosporidium removal capability of the membrane filtration module. This performance test must be applied to each production membrane module used by the system that was not directly challenge tested in order to verify Cryptosporidium

removal capability. Production modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.

20.20.2.2.8 If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the Division.

20.20.2.3 Direct integrity testing. Systems must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in subsections 20.20.2.3.1 through 20.20.2.3.6. A direct integrity test is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (i.e., one or more leaks that could result in contamination of the filtrate).

20.20.2.3.1 The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

20.20.2.3.2 The direct integrity method must have a resolution of 3 micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.

20.20.2.3.3 The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the Division, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the approach in either subsection 20.20.2.3.3.1 or 20.20.2.3.3.2 as applicable to the type of direct integrity test the system uses.

20.20.2.3.3.1 For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation:

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

Where:

LRVDIT = the sensitivity of the direct integrity test;

Q_p = total design filtrate flow from the membrane unit;

Q_{breach} = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured, and

VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

20.20.2.3.3.2 For direct integrity tests that use a particulate or molecular marker, the direct integrity test sensitivity must be calculated according to the following equation:

LRVDIT = LOG10 (Cf)- LOG10(Cp)

Where:

LRVDIT = the sensitivity of the direct integrity test;

Cf = the typical feed concentration of the marker used in the test; and Cp = the filtrate concentration of the marker from an integral membrane unit.

20.20.2.3.4 Systems must establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the Division.

20.20.2.3.5 If the result of a direct integrity test exceeds the control limit established under subsection 20.20.2.3.4, the system must remove the membrane unit from service. Systems must conduct a direct integrity test to verify any repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.

20.20.2.3.6 Systems must conduct direct integrity testing on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation. The Division may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for Cryptosporidium, or reliable process safeguards.

20.20.2.4 Indirect integrity monitoring. Systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in subsections 20.20.2.4.1 through 20.20.2.4.5.

Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in subsections 20.20.2.3.1 through 20.20.2.3.5 is not subject to the requirements for continuous indirect integrity monitoring. Systems must submit a monthly report to the Division summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.

20.20.2.4.1 Unless the Division approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.

20.20.2.4.2 Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.

20.20.2.4.3 Continuous monitoring must be separately conducted on each membrane unit.

20.20.2.4.4 If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (i.e., two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit as specified in subsections 20.20.2.3.1 through 20.20.2.3.5.

20.20.2.4.5 If indirect integrity monitoring includes a Division-approved alternative parameter and if the alternative parameter exceeds a Division-approved control limit for a period greater than 15 minutes, direct integrity testing must immediately be performed on the associated membrane units as specified in subsections 20.20.2.3.1 through 20.20.2.3.5.

20.20.3 Second stage filtration. Systems receive 0.5-log Cryptosporidium treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC, or other fine grain media following granular media filtration if the Division approves. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat the entire plant flow taken from a surface water or GWUDI source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The Division must approve the treatment credit based on an assessment of the design characteristics of the filtration process.

20.20.4 Slow sand filtration (as secondary filter). Systems are eligible to receive 2.5-log Cryptosporidium treatment credit for a slow sand filtration process that follows a separate stage of filtration if both filtration stages treat entire plant flow taken from a surface water or GWUDI source and no disinfectant residual is present in the influent water to the slow sand filtration process. The Division must approve the treatment credit based on an assessment of the design characteristics of the filtration process. This paragraph does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.

20.21 Inactivation toolbox components

20.21.1 Calculation of CT values.

20.21.1.1 CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems with treatment credit for chlorine dioxide or ozone under subsection 20.21.2 or 20.21.3 must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in subsection 10.6.

20.21.1.2 Systems with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, systems must add the Cryptosporidium CT values in each segment to determine the total CT for the treatment plant.

20.21.2 CT values for chlorine dioxide and ozone.

20.21.2.1 Systems receive the Cryptosporidium treatment credit listed in this table by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in subsection 20.21.1.

CT Values (mg-min/L) for Cryptosporidium Inactivation by Chlorine Dioxide [1]

Log credit	Water Temperature, °C										
	≤0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25	159	153	140	128	107	90	69	45	29	19	12
(ii) 0.5	319	305	279	256	214	180	138	89	58	38	24
(iii) 1.0	637	610	558	511	429	360	277	179	116	75	49

(iv) 1.5	956	915	838	767	643	539	415	268	174	113	73
(v) 2.0	1275	1220	1117	1023	858	719	553	357	232	150	98
(vi) 2.5	1594	1525	1396	1278	1072	899	691	447	289	188	122
(vii) 3.0	1912	1830	1675	1534	1286	1079	830	536	347	226	147

[1] Systems may use this equation to determine log credit between the indicated values: Log credit = (0.001506 x $(1.09116)^{Temp}$)x CT.

20.21.2.2 Systems receive the Cryptosporidium treatment credit listed in this table by meeting the corresponding ozone CT values for the applicable water temperature, as described in subsection 20.21.1.

CT Values (mg-min/L) for Cryptosporidium Inactivation by Ozone[1]

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

[1] Systems may use this equation to determine log credit between the indicated values: Log credit = (0.0397 x (1.09757)Temp) x CT.

20.21.3 Site-specific study. The Division may approve alternative chlorine dioxide or ozone CT values to those listed in subsection 20.21.2 on a site-specific basis. The Division must base this approval on a site-specific study a system conducts that follows a Division-approved protocol.

20.21.4 Ultraviolet light. Systems receive Cryptosporidium, Giardia lamblia, and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in subsection 20.21.4.1. Systems must validate and monitor UV reactors as described in subsections 20.21.4.2 and 20.21.4.3 to demonstrate that they are achieving a particular UV dose value for treatment credit.

20.21.4.1 UV dose table. The treatment credits listed in this table are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, systems must demonstrate an equivalent germicidal dose through reactor validation testing, as described in subsection 20.21.4.2. The UV dose values in this table are applicable only to post-filter applications of UV in filtered systems and to unfiltered systems.

UV Dose Table for Cryptosporidium, Giardia lamblia, and Virus Inactivation Credit

Log credit	Cryptosporidium UV dose (mJ/cm2)	Giardia lamblia UV dose (mJ/cm2)	Virus UV dose (mJ/cm2)
(i) 0.5	1.6	1.5	39
(ii) 1.0	2.5	2.1	58
(iii) 1.5	3.9	3.0	79
(iv) 2.0	5.8	5.2	100
(v) 2.5	8.5	7.7	121

(vi) 3.0	12	11	143
(vii) 3.5	15	15	163
(viii) 4.0	22	22	186

20.21.4.2 Reactor validation testing. Systems must use UV reactors that have undergone validation testing to determine the operating conditions under which the reactor delivers the UV dose required in subsection 20.21.4.1 (i.e., validated operating conditions). These operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status.

20.21.4.2.1 When determining validated operating conditions, systems must account for the following factors: UV absorbance of the water; lamp fouling and aging; measurement uncertainty of on-line sensors; UV dose distributions arising from the velocity profiles through the reactor; failure of UV lamps or other critical system components; and inlet and outlet piping or channel configurations of the UV reactor.

20.21.4.2.2 Validation testing must include the following: Full scale testing of a reactor that conforms uniformly to the UV reactors used by the system and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

20.21.4.2.3 The Division may approve an alternative approach to validation testing.

20.21.4.3 Reactor monitoring.

20.21.4.3.1 Systems must monitor their UV reactors to determine if the reactors are operating within validated conditions, as determined under subsection 20.21.4.2. This monitoring must include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the Division designates based on UV reactor operation. Systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol the Division approves.

20.21.4.3.2 To receive treatment credit for UV light, systems must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in subsections 20.21.4.1 and 20.21.4.2 of this section. Systems must demonstrate compliance with this condition by the monitoring required under subsection 20.21.4.3.1.

20.22 Reporting requirements

20.22.1 Systems must report sampling schedules under subsection 20.3 and source water monitoring results under subsection 20.7 unless they notify the Division that they will not conduct source water monitoring due to meeting the criteria of subsection 20.2.4.

20.22.2 Systems must report the use of uncovered finished water storage facilities to the Division as described in subsection 20.15.

20.22.3 Filtered systems must report their Cryptosporidium bin classification as described in subsection 20.11.

20.22.4 Unfiltered systems must report their mean source water Cryptosporidium level as described in subsection 20.13.

20.22.5 Systems must report disinfection profiles and benchmarks to the Division as described in subsections 20.9 through 20.10 prior to making a significant change in disinfection practice.

20.22.6 Systems must report to the Division in accordance with the following table for any microbial toolbox options used to comply with treatment requirements under subsections 20.12 or 20.13.

20.22.6.1 Alternatively, the Division may approve a system to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.

Microbial Toolbox Reporting Requirements

Toolbox option	Systems must submit the following information	On the following schedule

(1) Watershed control program (WCP)	(1) Notice of intention to develop a new or continue an existing watershed control program.	No later than two years before the application treatment compliance date in subsection 20.14.
	(2) Watershed control plan	No later than one year before the application compliance date in subsection 20.14.
	(3) Annual watershed control program status report	Every 12 months, beginning one year after the applicable treatment compliance date in subsection 20.14.
	(4) Watershed sanitary survey report	For community water systems, every three years beginning three years after the applicable treatment compliance date in subsection 20.14. For non-community water systems, every five years beginning five years after the applicable treatment compliance date in subsection 20.14.
(2) Alternative source/intake management	Verification that system has relocated the intake or adopted the intake withdrawal procedure reflected in monitoring results.	No later than applicable treatment compliance date in subsection 20.14.
(3) Presedimentation	Monthly verification of the following: (1) Continuous basin operation; (2) Treatment of 100% of the flow; (3) Continuous addition of a coagulant; and, (4) At least 0.5-log mean reduction of influent turbidity or compliance with alternative Division-approved performance criteria.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.
(4) Two-stage lime softening	Monthly verification of the following: (1) Chemical addition and hardness precipitation occurred in two separate and sequential softening stages prior to filtration; and, (2) Both stages treated 100% of the plant flow.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.
(5) Bank filtration	(1) Initial demonstration of the following: (A) Unconsolidated, predominantly sandy aquifer; and (B) Setback distance of at least 25 ft. (0.5-log credit) or 50 ft. (1.0-log credit)	No later than the applicable compliance date in subsection 20.14.
	(2) If monthly average of daily max turbidity is greater than 1 NTU then the system must report result and submit an assessment of the cause.	Report within 30 days following the month in which the monitoring was conducted, beginning on the applicable compliance date in subsection 20.14.
(6) Combined filter performance	Monthly verification of combined filter effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the 4 hour CFE measurements taken each month.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.

(7) Individual filter performance	Monthly verification of the following: (1) Individual filter effluent (IFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the samples each month in each filter; and, (2) No individual filter greater than 0.3 NTU in two consecutive readings 15 minutes apart.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.
(8) Demonstration of performance	(1) Results from testing following a Division approved protocol.	No later than the applicable compliance date in subsection 20.14.
	(2) As required by the Division, monthly verification of operation within conditions of Division approval for demonstration of performance credit.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.
(9) Bag filters and cartridge filters	(1) Demonstration that the following criteria are met: (A) Process meets the definition of bag or cartridge filter; and, (B) Removal efficiency established through challenge testing that meets criteria in this section.	No later than applicable treatment compliance date in subsection 20.14.
	(2) Monthly verification that 100% of plant flow was filtered.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.
(10) Membrane filtration	(1) Results of verification testing demonstrating the following: (A) Removal efficiency established through challenge testing that meets criteria in this section: and, (B) Integrity test method and parameters, including resolution, sensitivity, test frequency, control limits, and associated baseline.	No later than the applicable treatment compliance date in subsection 20.14.
	(2) Monthly report summarizing the following: (A) All direct integrity tests above the control limit: and, (B) If applicable, any turbidity or alternative Division-approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.
(11) Second stage filtration	Monthly verification that 100% of flow was filtered through both stages and that first stage was preceded by coagulation step.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.
(12) Slow sand filtration (as secondary filter)	Monthly verification that both a slow sand filter and a preceding separate stage of filtration treated 100% of flow from surface water or ground water under the direct influence of surface water sources.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.
(13) Chlorine dioxide	Summary of CT values for each day as described in subsection 20.21.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.

(14) Ozone	Summary of CT values for each day as described in subsection 20.21	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.
(15) UV	(1) Validation test results demonstrating operating conditions that achieve required UV dose.	No later than the applicable treatment compliance date in subsection 20.14.
	(2) Monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose as specified in subsection 20.21.4.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in subsection 20.14.

20.23 Recordkeeping requirements

20.23.1 Systems must keep results from the initial round of source water monitoring under subsection 20.2.1 and the second round of source water monitoring under subsection 20.2.2 until 3 years after bin classification under subsection 20.11 for filtered systems or determination of the mean Cryptosporidium level under subsection 20.11 for unfiltered systems for the particular round of monitoring.

20.23.2 Systems must keep any notification to the Division that they will not conduct source water monitoring due to meeting the criteria of subsection 20.2.4 for 3 years.

20.23.3 Systems must keep the results of treatment monitoring associated with microbial toolbox options under subsections 20.17 through 20.21 and with uncovered finished water reservoirs under subsection 20.15, as applicable, for 3 years.

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

20.24.1 A sanitary survey is an onsite review of the water source (identifying sources of contamination by using results of source water assessments where available), facilities, equipment, operation, maintenance, and monitoring compliance of a PWS to evaluate the adequacy of the PWS, its sources and operations, and the distribution of safe drinking water.

20.24.2 For the purposes of this section, a significant deficiency includes a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that **[~~EPA~~ the Division]** determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.

20.24.3 For sanitary surveys performed by **[~~EPA~~ the Division]**, systems must respond in writing to significant deficiencies identified in sanitary survey reports no later than 45 days after receipt of the report, indicating how and on what schedule the system will address significant deficiencies noted in the survey.

20.24.4 Systems must correct significant deficiencies identified in sanitary survey reports according to the schedule approved by **[~~EPA~~ the Division]**, or if there is no approved schedule, according to the schedule reported under subsection 20.24.3 if such deficiencies are within the control of the system.

5 DE Reg. 2121 (05/01/02)
9 DE Reg. 999 (12/01/05
15 DE Reg. 73 (07/01/12)
17 DE Reg. 439 (10/01/13)
19 DE Reg. 517 (12/01/15) (Final)