Appendix A

Primacy Revision Crosswalk

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SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
SUBPART A–GENERAL			
§141.2 DEFINITIONS			
Bag filters	Proposed §141.2		
Bank filtration	Proposed §141.2		
Cartridge filters	Proposed §141.2		
Flowing stream	Proposed §141.2		
Lake/reservoir	Proposed §141.2		
Membrane filtration	Proposed §141.2		
Off-stream raw water storage	Proposed §141.2		
Plant intake	Proposed §141.2		
Presedimentation	Proposed §141.2		
Two-stage lime softening	Proposed §141.2		

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SUBPART Q–PUBLIC NOTIFICATION OF DRINKING WATER VIOLATIONS			
APPENDIX A TO SUBPART Q OF PART 141–NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE			
10. LT2EWTR violations MCL/MRDL/TT Violations Tier of Public Notice Required Citation 2 141.720–141.729 Monitoring and Testing Procedure Violations Tier of Public Notice Required Citation 3 141.701–141.707; 141.711–141.713; 141.730	Appendix A I.A.10		
PROPOSED SUBPART W–ENHANCED FILTRATION AND DISINFECTION FOR *CRYPTOSPORIDIUM*			
PROPOSED §141.700 APPLICABILITY			
The requirements of this proposed subpart apply to all subpart H systems. Failure to comply with any requirement of this proposed subpart is a violation and requires public notification.	Proposed §141.700		
PROPOSED §141.701 GENERAL REQUIREMENTS			
All subpart H systems, including wholesale systems, must characterize their source water to determine what (if any) additional treatment is necessary for *Cryptosporidium*, unless they meet the criteria in either paragraph (f) or (g) of this section.	Proposed §141.701(a)		

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Systems serving at least 10,000 people that currently provide filtration or that are unfiltered and required to install filtration must conduct source water monitoring that includes *Cryptosporidium*, *E. coli*, and turbidity sampling and comply with the treatment requirements in proposed §141.720.	Proposed §141.701(b)		
Systems serving fewer than 10,000 people that currently provide filtration or that are unfiltered and required to install filtration must conduct source water monitoring consisting of *E. coli* sampling or sampling of an alternative indicator approved by the state. If the annual mean concentration of *E. coli* exceeds the levels specified in proposed §141.702(b), or if the level of a state-approved alternate indicator exceeds a state-approved alternative indicator trigger level, systems must conduct *Cryptosporidium* monitoring to complete the source water monitoring requirements and comply with the treatment requirements in proposed §141.720.	Proposed §141.701(c)		
Systems that are unfiltered and meet all the filtration avoidance criteria of §141.71 must conduct source water monitoring consisting of *Cryptosporidium* sampling and comply with the treatment requirements in proposed §141.721.	Proposed §141.701(d)		

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Systems must comply with the requirements in this proposed subpart based on the schedule in the table in proposed §141.701(e), except that systems are not required to conduct source water monitoring if they meet the criteria in paragraph (f) of this section for systems that currently provide filtration or that are unfiltered and required to install filtration or paragraph (g) of this section for systems that are unfiltered and meet all the filtration avoidance criteria of §141.71.	Proposed §141.701(e)		
Systems that currently provide filtration or that are unfiltered and required to install filtration are not required to conduct source water monitoring under this proposed subpart if the system currently provides or will provide a total of at least 5.5 log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of bin 4 in proposed §141.720. Systems must notify the state not later than the date the system is otherwise required to submit a sampling schedule for monitoring under proposed §141.703 and must install and operate technologies to provide a total of at least 5.5 log of treatment for *Cryptosporidium* by the applicable date in paragraph (e) of this section.	Proposed §141.701(f)		

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Systems that are unfiltered and meet all the filtration avoidance criteria of §141.71 are not required to conduct source water monitoring under this proposed subpart if the system currently provides or 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 proposed §141.721. Systems must notify the state not later than the date the system is otherwise required to submit a sampling schedule for monitoring under proposed §141.703. Systems must install and operate technologies to provide a total of at least 3 log *Cryptosporidium* inactivation by the applicable date in paragraph (e) of this section.	Proposed §141.701(g)		
Systems must comply with the uncovered finished water storage facility requirements in proposed §141.724 no later than [36 months after date of final rule publication].	Proposed §141.701(h)		
PROPOSED §141.702 SOURCE WATER MONITORING			
Systems must conduct initial source water monitoring as specified in proposed §141.701(b) through (f).	Proposed §141.702(a)		
Systems serving fewer than 10,000 people that provide filtration or that are unfiltered and required to install filtration must perform *Cryptosporidium* monitoring in accordance with proposed §141.701(e) if they meet any of the criteria in paragraphs (b)(1) through (4) of this section.	Proposed §141.702(b)		

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For systems using lake/reservoir sources, an annual mean *E. coli* concentration greater than 10 *E. coli*/100 mL, based on monitoring conducted under this section, unless the state approves an alternative indicator trigger.	Proposed §141.702(b)(1)		
For systems using flowing stream sources, an annual mean *E. coli* concentration greater than 50 *E. coli*/100 mL, based on monitoring conducted under this section, unless the state approves an alternative indicator trigger.	Proposed §141.702(b)(2)		
If the state approves an alternative to the indicator trigger in paragraph (b)(1) or (b)(2) of this section, an annual concentration that exceeds a state-approved trigger level, including an alternative *E. coli* level, based on monitoring conducted under this section.	Proposed §141.702(b)(3)		
The system does not conduct *E. coli* or other state-approved indicator monitoring as specified in proposed §141.701(e).	Proposed §141.702(b)(4)		
Systems may submit *Cryptosporidium* data collected prior to the monitoring start date to meet the initial source water monitoring requirements of paragraphs (a) through (b) of this section. Systems may also use *Cryptosporidium* data collected prior to the monitoring start date to 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 proposed §141.708.	Proposed §141.702(c)		

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Systems must conduct a second round of source water monitoring in accordance with the requirements in proposed §141.701(b) through (e) of this section, beginning no later than the dates specified in paragraphs (d)(1) through (3) of this section, unless they meet the criteria in either paragraph proposed §141.701(f) or (g).	Proposed §141.7141.702(d)		
Systems that serve at least 10,000 people must begin a second round of source water monitoring no later than **[108 months after date of final rule publication]**.	Proposed §141.702(d)(1)		
Systems serving fewer than 10,000 people that provide filtration or that are unfiltered and required to install filtration must begin a second round of source water monitoring no later than **[138 months after date of final rule publication]** and, if required to monitor for *Cryptosporidium* under paragraph (b) of this section, must begin *Cryptosporidium* monitoring no later than **[156 months after date of final rule publication]**.	Proposed §141.702(d)(2)		
Systems serving fewer than 10,000 people that are unfiltered and meet the filtration avoidance requirements of proposed §141.71 must begin a second round of source water monitoring no later than **[156 months after date of final rule publication]**.	Proposed §141.702(d)(3)		
PROPOSED §141.703 SAMPLING SCHEDULES			
Systems required to sample under §§141.701 through 141.702 must submit a sampling schedule that specifies the calendar dates that all required samples will be taken.	Proposed §141.703(a)		

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Systems serving at least 10,000 people must submit their sampling schedule for initial source water monitoring to EPA electronically at **[insert Internet address]** no later than **[3 months after date of final rule publication]**.	Proposed §141.703(a)(1)		
Systems serving fewer than 10,000 people that are filtered or that are unfiltered and required to install filtration must submit a sampling schedule for initial source water monitoring of *E. coli* or an alternative state-approved indicator to the state no later than **[27 months after date of final rule]**.	Proposed §141.703(a)(2)		
Filtered systems serving fewer than 10,000 people that are required to conduct *Cryptosporidium* monitoring and unfiltered systems serving fewer than 10,000 people must submit a sampling schedule for initial source water *Cryptosporidium* monitoring to the state no later than **[45 months after date of final rule publication]**.	Proposed §141.703(a)(3)		
Systems must submit a sampling schedule for the second round of source water monitoring to the state no later than 3 months prior to the date the system is required to begin the second round of monitoring under proposed §141.702(d).	Proposed §141.703(a)(4)		
Systems must collect samples within 2 days of the dates indicated in their sampling schedule.	Proposed §141.703(b)		

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If extreme conditions or situations exist that may pose danger to the sample collector, or which are unforeseen or cannot be avoided and which cause the system to be unable to sample in the required time frame, the system must sample as close to the required date as feasible and submit an explanation for the alternative sampling date with the analytical results.	Proposed §141.703(c)		
Systems that are unable to report a valid *Cryptosporidium* analytical result for a scheduled sampling date due to failure to comply with the analytical method requirements, including the quality control requirements in proposed §141.705, must collect a replacement sample within 14 days of being notified by the laboratory or the state that a result cannot be reported for that date and must submit an explanation for the replacement sample with the analytical results.	Proposed §141.703(d)		
PROPOSED §141.704 SAMPLING LOCATIONS			
Unless specified otherwise in this section, systems required to sample under proposed §141.701 through 141.702 must collect source water samples from the plant intake prior to any treatment. Where treatment is applied in an intake pipe such that sampling in the pipe prior to treatment is not feasible, systems must collect samples as close to the intake as is feasible, at a similar depth and distance from shore.	Proposed §141.704(a)		

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Presedimentation. Systems using a presedimentation basin must collect source water samples after the presedimentation basin but before any other treatment. Use of presedimentation basins during monitoring must be consistent with routine operational practice and the state may place reporting requirements to verify operational practices. Systems collecting samples after a presedimentation basin may not receive credit for the presedimentation basin under proposed §141.726(a).	Proposed §141.704(b)		
Raw water off-stream storage. Systems using an off-stream raw water storage reservoir must collect source water samples after the off-stream storage reservoir. Use of off-stream storage during monitoring must be consistent with routine operational practice and the state may place reporting requirements to verify operational practices.	Proposed §141.704(c)		
Bank filtration. The required sampling location for systems using bank filtration differs depending on whether the bank filtered water is treated by subsequent filtration for compliance with §141.173(b) or §141.552(a), as applicable.	Proposed §141.704(d)		

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Systems using bank filtered water that is treated by subsequent filtration for compliance with §141.173(b) or §141.552(a), as applicable, must collect source water samples from the well (i.e., after bank filtration), but before any other treatment. Use of bank filtration during monitoring must be consistent with routine operational practice and the state may place reporting requirements to verify operational practices. Systems collecting samples after a bank filtration process may not receive credit for the bank filtration under proposed §141.726(c).	Proposed §141.704(d)(1)		
Systems using bank filtration as an alternative filtration demonstration to meet their *Cryptosporidium* removal requirements under §141.173(b) or §141.552(a), as applicable, must collect source water samples in the surface water (i.e., prior to bank filtration).	Proposed §141.704(d)(2)		
Systems using a ground water source under the direct influence of surface water that meet all the criteria for avoiding filtration in proposed §141.71 and that do not provide filtration treatment must collect source water samples from the ground water (e.g., the well).	Proposed §141.704(d)(3)		
Multiple sources. Systems with plants that use multiple water sources at the same time, including multiple surface water sources and blended surface water and ground water sources, must collect samples as specified in paragraph (e)(1) or (2) of this section. The use of multiple sources during monitoring must be consistent with routine operational practice and the state may place reporting requirements to verify operational practices.	Proposed §141.704(e)		

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If a sampling tap is available where the sources are combined prior to treatment, the sample must be collected from the tap.	Proposed §141.704(e)(1)		
If there is not a sampling tap where the sources are combined prior to treatment, systems must collect samples at each source near the intake on the same day and must follow either paragraph (e)(2)(i) or (e)(2)(ii) of this section for sample analysis.	Proposed §141.704(e)(2)		
Composite samples from each source into one sample prior to analysis. In the composite, 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.	Proposed §141.704(e)(2)(i)		
Analyze samples from each source separately as specified in proposed §141.705, 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.	Proposed §141.704(e)(2)(ii)		
PROPOSED §141.705 ANALYTICAL METHODS			
Methods for *Cryptosporidium* analysis	Proposed §141.705(a)		
Systems are required to analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in paragraph (a) of this section. Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters approved by EPA for the methods listed in paragraph (a) of this section, up to a packed pellet volume of 2 mL.	Proposed §141.705(a)(1)		

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Matrix spikes (MS) samples as required by the methods in paragraph (a) of this section must be spiked and filtered by a laboratory approved for *Cryptosporidium* analysis under proposed §141.706. The volume of the MS sample must be within 10 percent of the volume of the unspiked sample that is collected at the same time, and the samples must be collected by splitting the sample stream or collecting the samples sequentially. The MS sample and the associated unspiked sample must be analyzed by the same procedure.	Proposed §141.705(a)(2)(i)		
If the volume of the MS sample is greater than 10 L, the system is permitted to 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.	Proposed §141.705(a)(2)(ii)		
Each sample batch must meet the quality control criteria for the methods listed in paragraph (a) of this section. Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery (OPR) samples; recovery for OPR samples must be 11% to 100%; for each method blank, oocysts must not be detected.	Proposed §141.705(a)(3)		

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Total *Cryptosporidium* oocysts as detected by fluorescein isothiocyanate (FITC) must be reported as determined by the color (apple green or alternative stain color approved under proposed §141.706(a) for the laboratory), size (4–6 µm) and shape (round to oval). This total includes all of the oocysts identified, less any atypical organisms identified by FITC, differential interference contrast (DIC) or 4,6-diamindino-2-phenylindole (DAPI), including those possessing spikes, stalks, appendages, pores, one or two large nuclei filling the cell, red fluorescing chloroplasts, crystals, and spores.	Proposed §141.705(a)(4)		
E. coli. Systems must use the methods listed in proposed §141.705(b) for enumeration of *E. coli* in source water **(table will be replaced with CFR cite from Guidelines Establishing Test Procedures for the Analysis of Pollutants; Analytical Methods for Biological Pollutants in Ambient Water when finalized—expected 2003)**.	Proposed §141.705(b)		
The time from sample collection to initiation of analysis may not exceed 24 hours. Systems must maintain samples between 0°C and 10°C during transit.	Proposed §141.705(b)(1)		
Turbidity. Systems must use methods for turbidity measurement approved in proposed §141.74.	Proposed §141.705(c)		

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PROPOSED §141.706 REQUIREMENTS FOR USE OF AN APPROVED LABORATORY			
Cryptosporidium. Systems must have *Cryptosporidium* samples analyzed by a laboratory that has passed a quality assurance evaluation under EPA's Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water or a laboratory that has been certified for *Cryptosporidium* analysis by an equivalent state laboratory certification program.	Proposed §141.706(a)		
E. coli. Any laboratory certified by the EPA, the National Environmental Laboratory Accreditation Conference or the state for total coliform or fecal coliform analysis in source water under proposed §141.74 is deemed approved for *E. coli* analysis under this proposed subpart when the laboratory uses the same technique for *E. coli* that the laboratory uses for source water in proposed §141.74.	Proposed §141.706(b)		
Turbidity. Measurements of turbidity must be made by a party approved by the state.	Proposed §141.706(c)		
PROPOSED §141.707 REPORTING SOURCE WATER MONITORING RESULTS			
All systems serving at least 10,000 people must submit the results of all initial source water monitoring required under proposed §141.702(a) to EPA electronically at [insert Internet address]. Systems that do not have the ability to submit data electronically may use an alternative format approved by EPA.	Proposed §141.707(a)		
Systems serving fewer than 10,000 people must submit the results of all initial source water monitoring required under proposed §141.702(a)–(b) to the state.	Proposed §141.707(b)		

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All systems must submit the results from the second round of source water monitoring required under proposed §141.702(d) to the state.	Proposed §141.707(c)		
Source water monitoring analysis results must be submitted not later than ten days after the end of first month following the month when the sample is collected. The submission must include the applicable information in paragraphs (e)(1) and (2) of this section.	Proposed §141.707(d)		
Systems must report the following data elements for each *Cryptosporidium* analysis: (i) PWS ID (ii) Facility ID (iii) Sample collection point (iv) Sample collection date (v) Sample type (field or matrix spike) (vi) Sample volume filtered (L), to nearest 1/4 L (vii) Was 100% of filtered volume examined (viii) Number of oocysts counted	Proposed §141.707(e)(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.	Proposed §141.707(e)(1)(i)		
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.	Proposed §141.707(e)(1)(ii)		

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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.	Proposed §141.707(e)(1)(iii)		
Systems must report the following data elements for each *E. coli* analysis: (i) PWS ID (ii) Facility ID (iii) Sample collection point (iv) Sample collection date (v) Analytical method number (vi) Method type (vii) Source type (viii) *E. coli*/100 mL (ix) Turbidity (Systems serving fewer than 10,000 people that are not required to monitor for turbidity under proposed §141.701(c) are not required to report turbidity with their *E. coli* results.)	Proposed §141.707(e)(2)		
PROPOSED §141.708 PREVIOUSLY COLLECTED DATA			
Systems may comply with the initial monitoring requirements of proposed §141.702(a) using *Cryptosporidium* data collected before the system is required to begin monitoring if the system meets the conditions in paragraphs (b) through (h) of this section and EPA notifies the system that the data are acceptable.	Proposed §141.708(a)		

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To be accepted, previously collected *Cryptosporidium* data must meet the conditions in paragraphs (b)(1) through (5) of this section.	Proposed §141.708(b)		
Samples were analyzed by laboratories using one of the analytical methods in paragraphs (b)(1)(i) through (iv) of this section.	Proposed §141.708(b)(1)		
Method 1623: *Cryptosporidium* and *Giardia* in Water by Filtration/IMS/ FA, 2001, EPA 821–R–01–025.	Proposed §141.708(b)(1)(i)		
Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA, 2001, EPA 821–R–01–026.	Proposed §141.708(b)(1)(ii)		
Method 1623: *Cryptosporidium* and *Giardia* in Water by Filtration/IMS/ FA, 1999, EPA 821–R–99–006.	Proposed §141.708(b)(1)(iii)		
Method 1622: *Cryptosporidium* in Water by Filtration/IMS/FA, 1999, EPA 821–R–99–001.	Proposed §141.708(b)(1)(iv)		
Samples were collected no less frequently than each calendar month on a regular schedule, beginning no earlier than January 1999.	Proposed §141.708(b)(2)		
Samples were collected in equal intervals of time over the entire collection period (e.g., weekly, monthly). Sample collection interval may vary for the conditions specified in proposed §141.703(c) and (d) if the system provides documentation of the condition.	Proposed §141.708(b)(3)		

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Samples met the conditions for sampling location specified in proposed §141.704. The system must report the use of bank filtration, presedimentation, and raw water off-stream storage during sampling.	Proposed §141.708(b)(4)		
For each 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 approved by EPA for the methods listed in paragraph (b)(1) of this section, up to a packed pellet volume of 2 mL.	Proposed §141.708(b)(5)		
The system must submit a letter to EPA concurrent with the submission of previously collected data certifying that the data meet the conditions in paragraphs (c)(1) and (2) of this section.	Proposed §141.708(c)		
The reported *Cryptosporidium* analysis results include all results generated by the system 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 proposed subpart, not spiked, and analyzed using the laboratory's routine process for the analytical methods listed in paragraph (a)(1) of this section.	Proposed §141.708(c)(1)		
The samples were representative of a plant's source water(s) and the source water(s) have not changed.	Proposed §141.708(c)(2)		
For each sample, the system must report the data elements in proposed §141.707(e)(1).	Proposed §141.708(d)		

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The laboratory or laboratories that generated the data must submit a letter to EPA concurrent with the submission of previously collected data certifying that the quality control criteria specified in the methods listed in paragraph (b)(1) of this section were met for each sample batch associated with the previously collected data. 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 previously collected data.	Proposed §141.708(e)		
If a system has at least 2 years of *Cryptosporidium* data collected before **[date of final rule publication]** and the system intends to use these data to comply with the initial source water monitoring required under proposed §141.702(a) in lieu of conducting new monitoring, the system must submit to EPA, no later than **[2 months after date of final rule publication]**, the previously collected data and the supporting information specified in this section. EPA will notify the system by **[4 months after date of final rule publication]** as to whether the data are acceptable. If EPA does not notify the system that the submitted data are acceptable, the system must carry out initial source water as specified in §§141.701 through 141.707 until EPA notifies the system that it has at least 2 years of acceptable data.	Proposed §141.708(f)		

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If a system has fewer than 2 years of *Cryptosporidium* data collected before **[date of final rule publication]** and the system intends to use these data to meet, in part, the initial source water monitoring required under proposed §141.702(a), the system must submit to EPA, no later than **[8 months after date of final rule publication]**, the previously collected data and the supporting information specified in this section. The system must carry out initial source water monitoring according to the requirements in proposed §141.701 through 141.707 until EPA notifies the system that it has at least 2 years of acceptable data.	Proposed §141.708(g)		
If a system has 2 or more years of previously collected data and the system intends to use these data to comply with the initial source water monitoring required under proposed §141.702(a), but the system also intends to carry out additional initial source water monitoring in order to base its determination of average *Cryptosporidium* concentration under proposed §141.709 or proposed §141.721 on more than 2 years of monitoring data, the system must submit to EPA, no later than **[8 months after date of final rule publication]**, the previously collected data and the supporting information specified in this section. The system must carry out initial source water monitoring according to the requirements in proposed §§141.701 through 141.707 until EPA notifies the system that it has at least 2 years of acceptable data.	Proposed §141.708(h)		

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PROPOSED §141.709 BIN CLASSIFICATION FOR FILTERED SYSTEMS			
Following completion of the initial source water monitoring required under proposed §141.702(a), filtered systems and unfiltered systems that are required to install filtration must calculate their initial *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under proposed §141.702(a), along with any previously collected data that satisfy the requirements of proposed §141.708, and following the procedures in paragraphs (b)(1) through (3) of this section.	Proposed §141.709(a)		
For systems that collect a total of at least 48 samples, the *Cryptosporidium* bin concentration is equal to the arithmetic mean of all sample concentrations.	Proposed §141.709(b)(1)		
For systems that serve at least 10,000 people and collect a total of at least 24 samples, but not more than 47 samples, the *Cryptosporidium* bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.	Proposed §141.709(b)(2)		
For systems that serve fewer than 10,000 people and take at least 24 samples, the *Cryptosporidium* bin concentration is equal to the arithmetic mean of all sample concentrations.	Proposed §141.709(b)(3)		
Filtered systems and unfiltered systems that are required to install filtration must determine their initial bin classification from the table in proposed §141.709(c) and using the *Cryptosporidium* bin concentration calculated under paragraph (a) of this section.	Proposed §141.709(c)		

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SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Following completion of the second round of source water monitoring required under proposed §141.702(d), filtered systems and unfiltered systems that are required to install filtration must recalculate their *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under proposed §141.702(d) and following the procedures in paragraphs (b)(1) through (3) of this section. Systems must then determine their bin classification a second time using this *Cryptosporidium* bin concentration and the table in paragraph (c) of this section.	Proposed §141.709(d)		
Any filtered system or unfiltered system that is required to install filtration that fails to complete the monitoring requirements of §§141.701 through 141.707 or chooses not to monitor pursuant to proposed §141.701(f) must meet the treatment requirements for bin 4 under proposed §141.720 by the date applicable under proposed §141.701(e).	Proposed §141.709(e)		
PROPOSED §141.711 DETERMINATION OF SYSTEMS REQUIRED TO PROFILE			
Subpart H of this part community and nontransient noncommunity water systems serving at least 10,000 people that do not have at least 5.5 log of *Cryptosporidium* treatment, equivalent to compliance with bin 4 in proposed §141.720, in place prior to the date when the system is required to begin profiling in proposed §141.712 are required to develop *Giardia lamblia* and virus disinfection profiles.	Proposed §141.711(a)		

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Subpart H community and nontransient noncommunity water systems serving fewer than 10,000 people that do not have at least 5.5 log of *Cryptosporidium* treatment, equivalent to compliance with bin 4 in proposed §141.720, in place prior to the date when the system is required to begin profiling in proposed §141.712 are required to develop *Giardia lamblia* and virus disinfection profiles if any of the criteria in paragraphs (b)(1) through (3) of this section apply.	Proposed §141.711(b)		
TTHM levels in the distribution system are at least 0.064 mg/L as a locational running annual average (LRAA) at any monitoring site. Systems must base their TTHM LRAA calculation on data collected for compliance under subpart L of this part after [final rule publication], or as determined by the state.	Proposed §141.711(b)(1)		
HAA5 levels in the distribution system are at least 0.048 mg/L as an LRAA at any monitoring site. Systems must base their HAA5 LRAA calculation on data collected for compliance under subpart L of this part after [final rule publication], or as determined by the state.	Proposed §141.711(b)(2)		
The system is required to monitor for *Cryptosporidium* under proposed §141.701(c).	Proposed §141.711(b)(3)		
In lieu of developing a new profile, systems may use the profile(s) developed under §141.172 or §§141.530 through 141.536 if the profile(s) meets the requirements of proposed §141.713(c).	Proposed §141.711(c)		

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PROPOSED §141.712 SCHEDULE FOR DISINFECTION PROFILING REQUIREMENTS			
Schedule of required disinfection profiling milestones	Proposed §141.712(a)		
PROPOSED §141.713 DEVELOPING A PROFILE			
Systems required to develop disinfection profiles under proposed §141.711 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. 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 proposed §141.74(b) as applicable. Systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the state.	Proposed §141.713(a)		
Systems with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in paragraphs (b)(1) through (4) of this section. Systems with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(1) through (4) of this section for each disinfection segment. Systems must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in proposed §141.74(a).	Proposed §141.713(b)		
For systems using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the state.	Proposed §141.713(b)(1)		

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For systems using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the state.	Proposed §141.713(b)(2)		
The disinfectant contact time(s) (T) must be determined during peak hourly flow.	Proposed §141.713(b)(3)		
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 during peak hourly flow.	Proposed §141.713(b)(4)		
In lieu of conducting new monitoring under paragraph (b) of this section, systems may elect to meet the requirements of paragraphs (c)(1) or (2) of this section.	Proposed §141.713(c)		
Systems that have at least 12 consecutive months of existing operational data that are substantially equivalent to data collected under the provisions of paragraph (b) of this section may use these data to develop disinfection profiles as specified in this section if the system has neither made a significant change to its treatment practice nor changed sources since the data were collected. Systems using existing operational data may develop disinfection profiles for a period of up to 3 years.	Proposed §141.713(c)(1)		

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Systems may use disinfection profile(s) developed under §141.172 or §§141.530 through 141.536 in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Systems that have not developed a virus profile under §141.172 or §§141.530 through 141.536 must develop a virus profile using the same monitoring data on which the *Giardia lamblia* profile is based.	Proposed §141.713(c)(2)		
Systems must calculate the total inactivation ratio for *Giardia lamblia* as specified in paragraphs (d)(1) through (3) of this section.	Proposed §141.713(d)		
Systems using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the methods in paragraph (d)(1)(i) or (ii) of this section.	Proposed §141.713(d)(1)		
Determine one inactivation ratio ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow.	Proposed §141.713(d)(1)(i)		
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 (Σ ($CTcalc/CT_{99.9}$)).	Proposed §141.713(d)(1)(ii)		

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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 (Σ(CTcalc/$CT_{99.9}$)) must be calculated using the method in paragraph (d)(1)(ii) of this section.	Proposed §141.713(d)(2)		
The system must determine the total logs of inactivation by multiplying the value calculated in paragraph (d)(1) or (d)(2) of this section by 3.0.	Proposed §141.713(d)(3)		
Systems must calculate the log of inactivation for viruses using a protocol approved by the state.	Proposed §141.713(d)(4)		
Systems must retain the 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.	Proposed §141.713(d)(5)		
PROPOSED §141.714 REQUIREMENTS WHEN MAKING A SIGNIFICANT CHANGE IN DISINFECTION PRACTICE			
A system that is required to develop a disinfection profile under the provisions of this proposed subpart and that plans to make a significant change to its disinfection practice must calculate a disinfection benchmark and must notify the state prior to making such a change. Significant changes to disinfection practice are defined in paragraphs (a)(1) through (4) of this section.	Proposed §141.714(a)		
Changes to the point of disinfection;	Proposed §141.714(a)(1)		

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Changes to the disinfectant(s) used in the treatment plant;	Proposed §141.714(a)(2)		
Changes to the disinfection process; and	Proposed §141.714(a)(3)		
Any other modification identified by the state.	Proposed §141.714(a)(4)		
Systems must use the procedures specified in paragraphs (a)(5)(i) and (ii) of this section to calculate a disinfection benchmark.	Proposed §141.714(a)(5)		
For the year of profiling data collected and calculated under proposed §141.713, or for each year with profiles covering more than one year, 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.	Proposed §141.714(a)(5)(i)		
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.	Proposed §141.714(a)(5)(ii)		
Systems must submit the information in paragraphs (a)(6)(i) through (iii) of this section when notifying the state that they are planning to make a significant change in disinfection practice.	Proposed §141.714(a)(6)		

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A description of the proposed change.	Proposed §141.714(a)(6)(i)		
The disinfection profile and benchmark for *Giardia lamblia* and viruses determined under proposed §141.713 and 141.714.	Proposed §141.714(a)(6)(ii)		
An analysis of how the proposed change will affect the current level of disinfection.	Proposed §141.714(a)(6)(iii)		
PROPOSED §141.720 TREATMENT REQUIREMENTS FOR FILTERED SYSTEMS			
Filtered systems or systems that are unfiltered and required to install filtration must provide the level of treatment for *Cryptosporidium* specified in the table in proposed §141.720(a), based on their bin classification as determined under proposed §141.709 and their existing treatment.	Proposed §141.720(a)		
Filtered systems must use one, or a combination, of the management and treatment options listed in proposed §141.722, termed the microbial toolbox, to meet the additional *Cryptosporidium* treatment requirements identified for each bin in paragraph (a) of this section.	Proposed §141.720(b)		
Systems classified in bin 3 and bin 4 must achieve at least 1 log of the additional treatment required under paragraph (a) of this section using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, and/or UV as specified in proposed §141.722.	Proposed §141.720(c)		

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PROPOSED §141.721 TREATMENT REQUIREMENTS FOR UNFILTERED SYSTEMS			
Following completion of the initial source water monitoring required under proposed §141.702(a), unfiltered systems that meet all filtration avoidance criteria of proposed §141.71 must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under proposed §141.702(a), along with any previously collected data that satisfy the requirements of proposed §141.708, and must meet the treatment requirements in paragraph (b)(1) or (2) of this section, as applicable, based on this concentration.	Proposed §141.721(a)		
Unfiltered systems with a mean *Cryptosporidium* concentration of 0.01 oocysts/L or less must provide at least 2 log *Cryptosporidium* inactivation.	Proposed §141.721(b)(1)		
Unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L must provide at least 3 log *Cryptosporidium* inactivation.	Proposed §141.721(b)(2)		
Unfiltered systems must use chlorine dioxide, ozone, or UV as specified in proposed §141.722 to meet the *Cryptosporidium* inactivation requirements of this section.	Proposed §141.721(c)		
Unfiltered systems that use chlorine dioxide or ozone and fail to achieve the *Cryptosporidium* log inactivation required in paragraph (b)(1) or (2) of this section, as applicable, on more than one day in the calendar month are in violation of the treatment technique requirement.	Proposed §141.721(c)(1)		

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Unfiltered systems that use UV light and fail to achieve the *Cryptosporidium* log inactivation required in paragraph (b)(1) or (2) of this section, as applicable, in at least 95% of the water that is delivered to the public during each calendar month, based on monitoring required under paragraph proposed §141.729(d)(4), are in violation of the treatment technique requirement.	Proposed §141.721(c)(2)		
Unfiltered systems must meet the combined *Cryptosporidium*, *Giardia lamblia*, and virus inactivation requirements of this section and proposed §141.72(a) using a minimum of two disinfectants, and each disinfectant must separately achieve the total inactivation required for either *Cryptosporidium*, *Giardia lamblia*, or viruses.	Proposed §141.721(d)		
Following completion of the second round of source water monitoring required under proposed §141.702(d), unfiltered systems that meet all filtration avoidance criteria of proposed §141.71 must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under proposed §141.702(d) and must meet the treatment requirements in paragraph (b)(1) or (2) of this section, as applicable, based on this concentration.	Proposed §141.721(e)		
Any unfiltered system that meets all filtration avoidance criteria of proposed §141.71 and fails to complete the monitoring requirements of §§141.701 through 141.707 or chooses not to monitor pursuant to proposed §141.701(g) must meet the treatment requirements of paragraph (b)(2) of this section by the date applicable under proposed §141.701(e).	Proposed §141.721(f)		

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PROPOSED §141.722 MICROBIAL TOOLBOX OPTIONS FOR MEETING *CRYPTOSPORIDIUM* TREATMENT REQUIREMENTS			
To meet the additional *Cryptosporidium* treatment requirements of §§141.720 and 141.721, systems must use microbial toolbox options listed in the table to proposed §141.722(a) that are designed, implemented, and operated in accordance with the requirements of this proposed subpart.	Proposed §141.722(a)		
Failure to comply with the requirements of this section in accordance with the schedule in proposed §141.701(e) is a treatment technique violation.	Proposed §141.722(b)		
PROPOSED §141.724 REQUIREMENTS FOR UNCOVERED FINISHED WATER STORAGE FACILITIES			
Systems using uncovered finished water storage facilities must comply with the conditions of one of the paragraphs (a)(1) through (3) of this section for each facility no later than the date specified in proposed §141.701(h).	Proposed §141.724(a)		
Systems must cover any uncovered finished water storage facility.	Proposed §141.724(a)(1)		
Systems must treat the discharge from the uncovered finished water storage facility to the distribution system to achieve at least 4 log virus inactivation using a protocol approved by the state.	Proposed §141.724(a)(2)		

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Systems must have a state-approved risk mitigation plan for the uncovered finished water storage facility that addresses physical access and site security, surface water runoff, animal and bird waste, and ongoing water quality assessment, and includes a schedule for plan implementation. Systems must implement the risk mitigation plan approved by the state. Systems must submit risk mitigation plans to the state for approval no later than [24 months after date of final rule publication].	Proposed §141.724(a)(3)		
Failure to comply with the requirements of this section in accordance with the schedule in proposed §141.701(h) is a treatment technique violation.	Proposed §141.724(b)		
PROPOSED §141.725 SOURCE TOOLBOX COMPONENTS			
Watershed control program	Proposed §141.725(a)		
Systems that intend to qualify for a 0.5 log credit for *Cryptosporidium* removal for a watershed control program must notify the state no later than one year after completing the source water monitoring requirements of proposed §141.702(b) that they intend to develop a watershed control program and to submit it for state approval.	Proposed §141.725(a)(1)		

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Systems must submit a proposed initial watershed control plan and a request for plan approval and 0.5 log *Cryptosporidium* removal credit to the state no later than 2 years after completing the source water monitoring requirements of proposed §141.702(b). Based on a review of the initial proposed watershed control plan, the state may approve, reject, or conditionally approve the plan. If the plan is approved, or if the system agrees to implement the state's conditions for approval, the system is awarded a 0.5 log credit for *Cryptosporidium* removal to apply against additional treatment requirements.	Proposed §141.725(a)(2)		
The application to the state for initial program approval must include elements in paragraphs (a)(3)(i) through (iii) of this section.	Proposed §141.725(a)(3)		
An analysis of the vulnerability of each source to *Cryptosporidium*. The vulnerability analysis must address the watershed upstream of the drinking water intake and must include the following: a characterization of the watershed hydrology, identification of an ''area of influence'' (the area to be considered in future watershed surveys) outside of which there is no significant probability of *Cryptosporidium* or fecal contamination affecting the drinking water intake, identification of both potential and actual sources of *Cryptosporidium* contamination, the relative impact of the sources of *Cryptosporidium* contamination on the system's source water quality, and an estimate of the seasonal variability of such contamination.	Proposed §141.725(a)(3)(i)		

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An analysis of control measures that could mitigate the sources of *Cryptosporidium* contamination identified during the vulnerability analysis. The analysis of control measures must address their relative effectiveness in reducing *Cryptosporidium* loading to the source water and their feasability and sustainability.	Proposed §141.725(a)(3)(ii)		
A plan that establishes goals and defines and prioritizes specific actions 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 role(s), identify resource requirements and commitments, and include a schedule for plan implementation.	Proposed §141.725(a)(3)(iii)		
Initial state approval of a watershed control plan and its associated 0.5 log *Cryptosporidium* removal credit is valid until the system completes the second round of *Cryptosporidium* monitoring required under proposed §141.702(d). Systems must complete the actions in paragraphs (a)(4)(i) through (iv) of this section to maintain state approval and the 0.5 log credit.	Proposed §141.725(a)(4)		

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Submit an annual watershed control program status report to the state by a date determined by the state. The annual watershed control program status report must describe the system's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the state or as the result of the watershed survey conducted under paragraph (a)(4)(ii) of this section. If it becomes necessary during implementation to make substantial changes in its approved watershed control program, the system must notify the state and provide a rationale prior to making any such changes. If any change is likely to reduce the level of source water protection, the system must also include the actions it will take to mitigate the effects in its notification.	Proposed §141.725(a)(4)(i)		
Conduct an annual watershed sanitary survey and submit the survey report to the state for approval. The survey must be conducted according to state guidelines and by persons approved by the state to conduct watershed surveys. The survey must encompass the area of the watershed that was identified in the state-approved watershed control plan as the area of influence and, at a minimum, assess the priority activities identified in the plan and identify any significant new sources of *Cryptosporidium*.	Proposed §141.725(a)(4)(ii)		

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Submit to the state a request for review and re-approval of the watershed control program and for a continuation of the 0.5 log removal credit for a subsequent approval period. The request must be provided to the state at least six months before the current approval period expires or by a date previously determined by the state. The request must include a summary of activities and issues identified during the previous approval period and a revised plan that addresses activities for the next approval period, including any new actual or potential sources of *Cryptosporidium* contamination and details of any proposed or expected changes from the existing state-approved program. The plan must address goals, prioritize specific actions to reduce source water *Cryptosporidium*, explain how actions are expected to contribute to achieving goals, identify partners and their role(s), resource requirements and commitments, and the schedule for plan implementation.	Proposed §141.725(a)(4)(iii)		
The annual status reports, watershed control plan and annual watershed sanitary surveys must be made 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. If approved by the state, the system may withhold portions of the annual status report, watershed control plan, and watershed sanitary survey based on security considerations.	Proposed §141.725(a)(4)(iv)		
Unfiltered systems may not claim credit for *Cryptosporidium* removal under this option.	Proposed §141.725(a)(5)		

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Alternative source	Proposed §141.725(b)		
If approved by the state, a system may be classified in a bin under proposed §141.709 based on monitoring that is conducted concurrently with source water monitoring under proposed §141.701 and reflects a different intake location (either in the same source or for an alternate source) or a different procedure for managing the timing or level of withdrawal from the source.	Proposed §141.725(b)(1)		
Sampling and analysis of *Cryptosporidium* in the concurrent round of monitoring must conform to the requirements for monitoring conducted under this proposed subpart to determine bin classification. Systems must submit the results of all monitoring to the state, along with supporting information documenting the operating conditions under which the samples were collected.	Proposed §141.725(b)(2)		
If the state classifies the system in a bin based on monitoring that reflects 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 use the intake management strategy, as applicable, no later than the applicable date for treatment technique implementation in proposed §141.701. The state may specify reporting requirements to verify operational practices.	Proposed §141.725(b)(3)		

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PROPOSED §141.726 PRE-FILTRATION TREATMENT TOOLBOX COMPONENTS			
Presedimentation. New presedimentation basins that meet the criteria in paragraphs (a)(1) through (4) of this section are eligible for 0.5 log *Cryptosporidium* removal credit. Systems with presedimentation basins existing when the system is required to conduct monitoring under proposed §141.702(a) may not claim this credit and, during periods when the basins are in use, must collect samples after the basins for the purpose of determining bin classification under proposed §141.709.	Proposed §141.726(a)		
The presedimentation basin must be in continuous operation and must treat all of the flow reaching the treatment plant.	Proposed §141.726(a)(1)		
The system must continuously add a coagulant to the presedimentation basin.	Proposed §141.726(a)(2)		
Presedimentation basin influent and effluent turbidity must be measured at least once per day or more frequently as determined by the state.	Proposed §141.726(a)(3)		
The system must demonstrate on a monthly basis at least 0.5 log reduction of influent turbidity through the presedimentation process in at least 11 of the 12 previous consecutive months.	Proposed §141.726(a)(4)		
The monthly demonstration of turbidity reduction must be based on the mean of daily turbidity readings collected under paragraph (a)(3) of this section and calculated as follows: $\log_{10}$(monthly mean of daily influent turbidity)—$\log_{10}$(monthly mean of daily effluent turbidity).	Proposed §141.726(a)(4)(i)		

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If the presedimentation process has not been in operation for 12 months, the system must verify on a monthly basis at least 0.5 log reduction of influent turbidity through the presedimentation process, calculated as specified in this paragraph, for at least all but any one of the months of operation.	Proposed §141.726(a)(4)(ii)		
Two-stage lime softening. Systems that operate a two-stage lime softening plant are eligible for an additional 0.5 log *Cryptosporidium* removal credit if there is a second clarification step between the primary clarifier and filter(s) that is operated continuously. Both clarifiers must treat all of the plant flow and a coagulant, which may be excess lime or magnesium hydroxide, must be present in both clarifiers.	Proposed §141.726(b)		
Bank filtration. New bank filtration that serves as pretreatment to a filtration plant is eligible for either a 0.5 or a 1.0 log *Cryptosporidium* removal credit towards the requirements of this proposed subpart if it meets the design criteria specified in paragraphs (c)(1) through (c)(5) of this section and the monitoring and reporting criteria of paragraph (c)(6) of this section. Wells with a ground water flow path of at least 25 feet are eligible for 0.5 log removal credit; wells with a ground water flow path of at least 50 feet are eligible for 1.0 log removal credit. The ground water flow path must be determined as specified in paragraph (c)(5) of this section.	Proposed §141.726(c)		
Only horizontal and vertical wells are eligible for bank filtration removal credit.	Proposed §141.726(c)(1)		

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Only wells in granular aquifers are eligible for bank filtration removal credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. The aquifer material must be unconsolidated as demonstrated by the aquifer characterization specified in paragraph (c)(3) of this section, unless the system meets the conditions of paragraph (c)(4) of this section. Wells located in consolidated aquifers, fractured bedrock, karst limestone, and gravel aquifers are not eligible for bank filtration removal credit.	Proposed §141.726(c)(2)		
A system seeking removal credit for bank filtration must characterize the aquifer at the well site to determine aquifer properties. The aquifer characterization must include the collection of relatively undisturbed continuous core samples from the surface to a depth at least equal to the bottom of the well screen. The recovered core length must be at least 90 percent of the total projected depth to the well screen, and each sampled interval must be a composite of no more than 2 feet in length. A well is eligible for removal credit if at least 90 percent of the composited intervals from the aquifer contain at least 10 percent fine grained material, which is defined as grains less than 1.0 mm in diameter.	Proposed §141.726(c)(3)		
Wells constructed in partially consolidated granular aquifers are eligible for removal credit if approved by the state based on a demonstraton by the system that the aquifer provides sufficient natural filtration. The demonstration must include a characterization of the extent of cementation and fractures present in the aquifer.	Proposed §141.726(c)(4)		

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For vertical wells, the ground water flow path is the measured horizontal distance from the edge of the surface water body to the well. This horizontal distance to the surface water must be determined using the floodway boundary or 100 year flood elevation boundary as delineated on Federal Emergency Management Agency (FEMA) Flood Insurance Rate maps. If the floodway boundary or 100 year flood elevation boundary is not delineated, systems must determine the floodway or 100 year flood elevation boundary using methods substantially equivalent to those used in preparing FEMA Flood Insurance Rate maps. For horizontal wells, the ground water flow path is the closest measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral intake.	Proposed §141.726(c)(5)		
Turbidity measurements must be performed on representative samples from each wellhead at least every four hours that the bank filtration is in operation. Continuous turbidity monitoring at each wellhead may be used if the system validates the continuous measurement for accuracy on a regular basis using a protocol approved by the state. If the monthly average of daily maximum turbidity values at any well exceeds 1 NTU, the system must report this finding to the state within 30 days. In addition, within 30 days of the exceedance, the system must conduct an assessment to determine the cause of the high turbidity levels and submit that assessment to the state for a determination of whether any previously allowed credit is still appropriate.	Proposed §141.726(c)(6)		

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Systems with bank filtration that serves as pretreatment to a filtration plant and that exists when the system is required to conduct monitoring under proposed §141.702(a) may not claim this credit. During periods when the bank filtration is in use, systems must collect samples after the bank filtration for the purpose of determining bin classification under proposed §141.709.	Proposed §141.726(c)(7)		
PROPOSED §141.727 TREATMENT PERFORMANCE TOOLBOX COMPONENTS			
Combined filter performance. Systems using conventional filtration treatment or direct filtration treatment may claim an additional 0.5 log *Cryptosporidium* removal credit for any month at each plant that demonstrates that combined filter effluent (CFE) turbidity levels are less than or equal to 0.15 NTU in at least 95 percent of the measurements taken each month, based on sample measurements collected under §§141.73,141.173(a) and 141.551. Systems may not claim credit under this paragraph and paragraph (b) in the same month.	Proposed §141.727(a)		
Individual filter performance. Systems using conventional filtration treatment or direct filtration treatment may claim an additional 1.0 log *Cryptosporidium* removal credit for any month at each plant that meets both the individual filter effluent (IFE) turbidity requirements of paragraphs (b)(1) and (2) of this section, based on monitoring conducted under §§141.174(a) and 141.560.	Proposed §141.727(b)		

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IFE turbidity must be less than 0.1 NTU in at least 95% of the maximum daily values recorded at each filter in each month, excluding the 15 minute period following return to service from a filter backwash.	Proposed §141.727(b)(1)		
No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.	Proposed §141.727(b)(2)		
Demonstration of performance. Systems may demonstrate to the state, through the use of state-approved protocols, that a plant, or unit process of a plant, achieves a mean *Cryptosporidium* removal efficiency greater than any presumptive credit specified under proposed §141.720 or §§141.725 through 141.728. Systems are eligible for an increased *Cryptosporidium* removal credit if the state determines that the plant or process can reliably achieve such a removal efficiency on a continuing basis and the state provides written notification of its determination to the system. States may establish ongoing monitoring and/or performance requirements the state determines are necessary to demonstrate the greater credit and may require the system to report operational data on a monthly basis to verify that conditions under which the demonstration of performance was awarded are maintained during routine operations. If the state determines that a plant, or unit process of a plant, achieves an average *Cryptosporidium* removal efficiency less than any presumptive credit specified under proposed §141.720 or §§141.725 through 141.728, the state may assign the lower credit to the plant or unit process.	Proposed §141.727(c)(1)		

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Systems may not claim presumptive credit for any toolbox box component in §§141.726, 141.727(a) and (b), or 141.728 if that component is also included in the demonstration of performance credit.	Proposed §141.727(c)(2)		
PROPOSED §141.728 ADDITIONAL FILTRATION TOOLBOX COMPONENTS			
Bag and cartridge filters. Systems are eligible for a 1 log *Cryptosporidium* removal credit for bag filters and a 2 log *Cryptosporidium* removal credit for cartridge filters by meeting the criteria in paragraphs (a)(1) through (a)(10) of this section. The request to the state for this credit must include the results of challenge testing that meets the requirements of paragraphs (a)(2) through (a)(9) of this section.	Proposed §141.728(a)		
To receive a 1 log *Cryptosporidium* removal credit for a bag filter, the filter must demonstrate a removal efficiency of 2 log or greater for *Cryptosporidium*. To receive a 2 log *Cryptosporidium* removal credit for a cartridge filter, the filter must demonstrate a removal efficiency of 3 log or greater for *Cryptosporidium*. Removal efficiency must be demonstrated through challenge testing conducted according to the criteria in paragraphs (a)(2) through (a)(9) of this section. The state may accept data from challenge testing conducted prior to **[date of final rule publication]** in lieu of additional testing if the prior testing was consistent with the criteria specified in paragraphs (a)(2) through (a)(9) of this section.	Proposed §141.728(a)(1)		

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Challenge testing must be performed on full-scale bag or cartridge filters that are identical in material and construction to the filters proposed for use in full-scale treatment facilities for removal of *Cryptosporidium*.	Proposed §141.728(a)(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 must be determined using a method capable of discreetly quantifying the specific organism or surrogate used in the test; gross measurements such as turbidity may not be used.	Proposed §141.728(a)(3)		
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 equation in either paragraph (a)(4)(i) or (a)(4)(ii) of this section as applicable.	Proposed §141.728(a)(4)		
For cartridge filters: Maximum Feed Concentration = $3.16\times10^4\times$ (Filtrate Detection Limit).	Proposed §141.728(a)(4)(i)		
For bag filters: Maximum Feed Concentration = $3.16\times10^3\times$ (Filtrate Detection Limit).	Proposed §141.728(a)(4)(ii)		
Challenge testing must be conducted at the maximum design flow rate for the filter as specified by the manufacturer.	Proposed §141.728(a)(5)		

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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 proposed subpart.	Proposed §141.728(a)(6)		
Each filter evaluated must be challenged with the challenge particulate during three periods over the filtration cycle: within two hours of start-up after a new bag or cartridge filter has been installed; when the pressure drop is between 45 and 55 percent of the terminal pressure drop; and at the end of the run after the pressure drop has reached 100 percent of the terminal pressure drop.	Proposed §141.728(a)(7)		
Removal efficiency of a bag or cartridge 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 used during the challenge test; and C_p = the filtrate concentration observed 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. An LRV must be calculated for each filter evaluated during the testing.	Proposed §141.728(a)(8)		

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If fewer than 20 filters are tested, the removal efficiency for the filtration device must be set equal to the lowest of the representative LRVs among the filters tested. If 20 or more filters are tested, then removal efficiency of the filtration device must be set equal to the 10th percentile of the representative LRVs among 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 system may calculate the 10th percentile using linear interpolation.	Proposed §141.728(a)(9)		
If a previously tested bag or cartridge filter is modified in a manner that could change the removal efficiency of the filter, addition[al] challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted to the state.	Proposed §141.728(a)(10)		
Membrane filtration. Systems using a membrane filtration process, including a membrane cartridge filter that meets the definition of membrane filtration and the integrity testing requirements of this proposed subpart, are eligible for a *Cryptosporidium* removal credit equal to the lower value of paragraph (b)(1)(i) or (b)(1) (ii) of this section:	Proposed §141.728(b)(1)		
The removal efficiency demonstrated during challenge testing conducted under the conditions in paragraph (b)(2) of this section.	Proposed §141.728(b)(1)(i)		
The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in paragraph (b)(3) of this section.	Proposed §141.728(b)(1)(ii)		

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Challenge Testing. The membrane used by the system must undergo challenge testing to evaluate removal efficiency, and the system must submit the results of challenge testing to the state. Challenge testing must be conducted according to the criteria in paragraphs (b)(2)(i) through (b)(2)(vii) of this section. The state may accept data from challenge testing conducted prior to **[date of final rule publication]** in lieu of additional testing if the prior testing was consistent with the criteria in paragraphs (b)(2)(i) through (b)(2) (vii) of this section.	Proposed §141.728(b)(2)		
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.	Proposed §141.728(b)(2)(i)		
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 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.	Proposed §141.728(b)(2)(ii)		

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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: Maximum Feed Concentration = 3.16×10^6 × (Filtrate Detection Limit)	Proposed §141.728(b)(2)(iii)		
Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacture for the membrane module. Flux is defined as the rate of flow per unit of membrane area. Recovery is defined as the ratio of filtrate volume produced by a membrane to feed water volume applied to a membrane over the course of an uninterrupted operating cycle. An operating cycle is bounded by two consecutive backwash or cleaning events. For the purpose of challenge testing in this section, recovery does not consider losses that occur due to the use of filtrate in backwashing or cleaning operations.	Proposed §141.728(b)(2)(iv)		

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Removal efficiency of a membrane module during challenge testing must be determined as a log removal 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 used during the challenge test; and C_p = the filtrate concentration observed 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. An LRV must be calculated for each membrane module evaluated during the test.	Proposed §141.728(b)(2)(v)		
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 applicable 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 applicable 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.	Proposed §141.728(b)(2)(vi)		

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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 process. This performance test must be applied to each production membrane module used by the system that did not undergo a challenge test in order to verify *Cryptosporidium* removal capability. Production modules that do not meet the established QCRV are not eligible for the removal credit demonstrated during the challenge test.	Proposed §141.728(b)(2)(vii)		
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, addition[al] challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the state.	Proposed §141.728(b)(2)(viii)		
Direct integrity testing. Systems must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in paragraphs (b)(3)(i) through (b)(3)(vi) of this section.	Proposed §141.728(b)(3)		
The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is 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 maintenance.	Proposed §141.728(b)(3)(i)		

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The direct integrity method must have a resolution of 3 µm or less, where resolution is defined as the smallest leak size that contributes to a response from the direct integrity test.	Proposed §141.728(b)(3)(ii)		
The system must demonstrate that the direct integrity test can verify the log removal credit awarded to the membrane filtration process by the state using the approach in either paragraph (b)(2)(iii)(A) or (b)(2)(iii)(B) of this section as applicable based on the type of direct integrity test.	Proposed §141.728(b)(3)(iii)		
For direct integrity tests that use an applied pressure or vacuum, the maximum log removal value that can be verified by the test must be calculated according to the following equation: $LRV_{DIT} = LOG_{10}(Q_p /(VCF \times Q_{breach}))$ where LRV_{DIT} = maximum log removal value that can be verified by a 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.	Proposed §141.728(b)(3)(iii)(A)		

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For direct integrity tests that use a particulate or molecular marker, the maximum log removal value that can be verified by the test must be calculated according to the following equation: $LRV_{DIT} = LOG_{10}(C_f) - LOG_{10}(C_p)$ where LRV_{DIT} = maximum log removal value that can be verified by a 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.	Proposed §141.728(b)(3)(iii)(B)		
Systems must establish a control limit for the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the state.	Proposed §141.728(b)(3)(iv)		
If the result of a direct integrity test is outside the control limit established under paragraphs (b)(3)(i) through (b)(3)(iv) of this section, the membrane unit must be removed from service. A direct integrity test must be conducted to verify any repairs, and the membrane unit may be returned to service only if the direct integrity test is within the established control limit.	Proposed §141.728(b)(3)(v)		
Direct integrity testing must be conducted on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation.	Proposed §141.728(b)(3)(vi)		

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Indirect integrity monitoring. Systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in paragraphs (b)(4)(i) through (b)(4)(v) of this section. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in paragraphs (b)(3)(i) through (b)(3)(v) of this section is not subject to the requirements for continuous indirect integrity monitoring.	Proposed §141.728(b)(4)		
Unless the state approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.	Proposed §141.728(b)(4)(i)		
Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.	Proposed §141.728(b)(4)(ii)		
Continuous monitoring must be separately conducted on each membrane unit.	Proposed §141.728(b)(4)(iii)		
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 be performed on the associated membrane units as specified in paragraphs (b)(3)(i) through (b)(3)(v) of this section.	Proposed §141.728(b)(4)(iv)		

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If indirect integrity monitoring includes a state-approved alternative parameter and if the alternative parameter exceeds a state-approved control limit for a period greater than 15 minutes, direct integrity testing must be performed on the associated membrane units as specified in paragraphs (b)(3)(i) through (b)(3)(v) of this section.	Proposed §141.728(b)(4)(v)		
Second stage filtration. Systems are eligible for an additional 0.5 log *Cryptosporidium* removal credit if they have a separate second stage filtration process consisting of rapid sand, dual media, GAC, or other fine grain media in a separate stage following rapid sand or dual media filtration. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat 100% of the flow. A cap, such as GAC, on a single stage of filtration is not eligible for this credit.	Proposed §141.728(c)		
Slow sand filtration. Systems may claim a 2.5 log *Cryptosporidium* removal credit for a slow sand filtration process that follows another separate filtration process if all the flow is treated by both processes and no disinfectant residual is present in the influent water to the slow sand filtration process.	Proposed §141.728(d)		

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PROPOSED §141.729 INACTIVATION TOOLBOX COMPONENTS			
Calculation of CT values. CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in proposed §141.74(a) and 141.74(b).	Proposed §141.729(a)(1)		
Systems with several disinfection segments (a segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume) in sequence along the treatment train, may calculate the CT for each disinfection segment and use the sum of the *Cryptosporidium* log inactivation values achieved through the plant.	Proposed §141.729(a)(2)		
CT values for chlorine dioxide. Systems using chlorine dioxide must calculate CT in accordance with proposed §141.729(a).	Proposed §141.729(b)(1)		
Unless the state approves alternative CT values for a system under paragraph (b)(3) of this section, systems must use the table in proposed §141.729(b)(2) to determine *Cryptosporidium* log inactivation credit.	Proposed §141.729(b)(2)		
Systems may conduct a site-specific inactivation study to determine the CT values necessary to meet a specified *Cryptosporidium* log inactivation level, using a state-approved protocol. The alternative CT values determined from the site-specific study and the method of calculation must be approved by the state.	Proposed §141.729(b)(3)		

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CT values for ozone. Systems using ozone must calculate CT in accordance with proposed §141.729(a).	Proposed §141.729(c)(1)		
Unless the state approves alternative CT values for a system under paragraph (c)(3) of this section, systems must use the table in proposed §141.729(c)(2) to determine *Cryptosporidium* log inactivation credit.	Proposed §141.729(c)(2)		
Systems may conduct a site-specific inactivation study to determine the CT values necessary to meet a specified *Cryptosporidium* log inactivation level, using a state-approved protocol. The alternative CT values determined from the site-specific study and the method of calculation must be approved by the state.	Proposed §141.729(c)(3)		
Ultraviolet light. Systems may claim credit for ultraviolet (UV) processes for inactivation of *Cryptosporidium*, *Giardia lamblia*, and viruses. The allowable inactivation credit for each pathogen must be based on the UV dose delivered by the system's UV reactors in relation to the UV dose table in paragraph (d)(2) of this section.	Proposed §141.729(d)(1)		

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UV dose table. The log credits given in the UV dose table in proposed §141.729(d)(2) are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. Systems may apply this table to UV reactors with other lamp types through reactor validation testing (i.e., performance demonstration) as described in paragraph (d)(3) of this section. The UV dose values in the table in proposed §141.729(d)(2) are applicable only to post-filter application of UV in systems that filter under subpart H of this part and to unfiltered systems meeting the filtration avoidance criteria in subparts H, P, and T of this part.	Proposed §141.729(d)(2)		
Reactor validation testing. For a system to receive inactivation credit for a UV reactor, the reactor must undergo the validation testing in paragraphs (d)(3)(i) and (d)(3)(ii) of this section, unless the state approves an alternative approach. The validation testing must demonstrate the operating conditions under which the reactor can deliver the UV dose required in paragraph (d)(2) of this section.	Proposed §141.729(d)(3)		

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Validation testing of UV reactors must determine a range of operating conditions that can be monitored by the system and under which the reactor delivers the required UV dose. At a minimum, these operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status. The validated operating conditions determined by this testing must account for the following: 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.	Proposed §141.729(d)(3)(i)		
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.	Proposed §141.729(d)(3)(ii)		
Reactor monitoring. Systems must monitor their UV reactors to demonstrate that they are operating within the range of conditions that were validated by the testing described in paragraphs (d)(3)(i) and (d)(3)(ii) of this section to achieve the required UV dose in paragraph (d)(2) of this section. Systems must monitor for UV intensity as measured by a UV sensor, flow rate, and lamp outage and for any other parameters required by the state. Systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol approved by the state.	Proposed §141.729(d)(4)		

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PROPOSED §141.730 REPORTING REQUIREMENTS			
Systems must follow the requirements for reporting sampling schedules under proposed §141.703 and for reporting source water monitoring results under proposed §141.707 unless they notify the state that they will not conduct source water monitoring due to meeting the criteria of proposed §141.701(f) or (g).	Proposed §141.730(a)		
Systems using uncovered finished water storage facilities must notify the state of the use of each facility no later than **[24 months after date of final rule publication]**.	Proposed §141.730(b)		
Filtered systems and unfiltered systems that are required to install filtration must report their *Cryptosporidium* bin classification, as determined under using the procedures in proposed §141.709, to the state by the applicable dates in paragraph (c)(1) or (2) of this section.	Proposed §141.730(c)		
Systems that serve at least 10,000 people must report their initial bin classification no later than **[36 months after date of final rule publication]** and must report their bin classification determined using results from the second round of source water monitoring no later than **[138 months after date of final rule publication]**.	Proposed §141.730(c)(1)		
Systems that serve fewer than 10,000 people must report their initial bin classification no later than **[66 months after date of final rule publication]** and must report their bin classification determined using results from the second round of source water monitoring no later than **[174 months after date of final rule publication]**.	Proposed §141.730(c)(2)		

SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Unfiltered systems that meet all filtration avoidance criteria of proposed §141.71 must report their mean *Cryptosporidium* concentration, as determined under proposed §141.721, to the state by the applicable dates in paragraph (d)(1) or (2) of this section.	Proposed §141.730(d)		
Systems that serve at least 10,000 people must report their initial mean *Cryptosporidium* concentration no later than [36 months after date of final rule publication] and must report their mean *Cryptosporidium* concentration determined using results from the second round of source water monitoring no later than [138 months after date of final rule publication].	Proposed §141.730(d)(1)		
Systems that serve fewer than 10,000 people must report their initial mean *Cryptosporidium* concentration no later than [66 months after date of final rule publication] and must report their mean *Cryptosporidium* concentration determined using results from the second round of source water monitoring no later than [174 months after date of final rule publication].	Proposed §141.730(d)(2)		
Systems must report to the state in accordance with the table in proposed §141.730(e) for any toolbox options used to comply with the *Cryptosporidium* treatment technique requirements under proposed §141.720 or proposed §141.721. The state may place additional reporting requirements it determines to be necessary to verify operation in accordance with required criteria for all toolbox options.	Proposed §141.730(e)		

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SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	STATE CITATION (DOCUMENT TITLE, PAGE NUMBER, SECTION/PARAGRAPH)	DIFFERENT FROM FED. REQUIREMENT? (EXPLAIN ON SEPARATE SHEET)
Systems must report to the state the information associated with disinfection profiling and benchmarking requirements of proposed §141.711 to 141.714 in accordance with the tables in proposed §141.730(f).	Proposed §141.730(f)		
PROPOSED §141.731 RECORDKEEPING REQUIREMENTS			
Systems must keep results from monitoring required under proposed §141.702 until 36 months after all source water monitoring required under this section has been completed.	Proposed §141.731(a)		
Systems must keep a record of any notification to the state that they will not conduct source water monitoring due to meeting the criteria of proposed §141.701(f) or (g).	Proposed §141.731(b)		
Systems required to develop disinfection profiles under proposed §141.711 must keep disinfection profiles on file for state review during sanitary surveys.	Proposed §141.731(c)		

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SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	EXPLANATION OF STATE POLICIES AND PROCEDURES
PART 142–NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION		
§142.14 RECORDS KEPT BY STATES		
Any decisions made pursuant to the provisions of part 141, proposed subpart W of this chapter.	Proposed §142.14(a)(9)	
Results of source water *E. coli* and *Cryptosporidium* monitoring.	Proposed §142.14(a)(9)(i)	
Initial bin classification for each system that currently provides filtration or that is unfiltered and required to install filtration, along with any change in bin classification due to watershed assessment during sanitary surveys or the second round of source water monitoring.	Proposed §142.14(a)(9)(ii)	
A determination of whether each system that is unfiltered and meets all the filtration avoidance criteria of proposed §141.71 of this chapter has a mean source water *Cryptosporidium* level above 0.01 oocysts/L, along with any changes in this determination due to the second round of source water monitoring.	Proposed §142.14(a)(9)(iii)	
The treatment or control measures that systems use to meet their *Cryptosporidium* treatment requirements under proposed §141.720 or proposed §141.721 of this section.	Proposed §142.14(a)(9)(iv)	
A list of systems required to cover or treat the effluent of an uncovered finished water reservoir.	Proposed §142.14(a)(9)(v)	
A list of systems for which the state has waived the requirement to cover or treat the effluent of uncovered finished water storage facilities and supporting documentation of the risk mitigation plan.	Proposed §142.14(a)(9)(vi)	

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SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	EXPLANATION OF STATE POLICIES AND PROCEDURES
§142.15 REPORTS BY STATES		
Proposed Subpart W. The initial bin classification for each system that currently provides filtration or that is unfiltered and required to install filtration, along with any change in bin classification due to watershed assessment during sanitary surveys or the second round of source water monitoring.	Proposed §142.15(c)(6)(i)	
A determination of whether each system that is unfiltered and meets all the filtration avoidance criteria of proposed §141.71 of this chapter has a mean source water *Cryptosporidium* level above 0.01 oocysts/L, along with any changes in this determination due to the second round of source water monitoring.	Proposed §142.15(c)(6)(ii)	
§142.16 SPECIAL PRIMACY CONDITIONS		
Requirements for states to adopt 40 CFR part 141, proposed subpart W. In addition to the general primacy requirements elsewhere in this part, including the requirements that state regulations be at least as stringent as federal requirements, an application for approval of a state program revision that adopts 40 CFR part 141, proposed subpart W, must contain a description of how the state will accomplish the following program requirements where allowed in state programs.	Proposed §142.16(n)	
Assess significant changes in the watershed and source water as part of the sanitary survey process and determine appropriate follow-up action.	Proposed §142.16(n)(1)	
Approve watershed control programs for the 0.5 log watershed control program credit in the microbial toolbox.	Proposed §142.16(n)(2)	

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SUMMARY OF FEDERAL REQUIREMENT	FEDERAL CITATION	EXPLANATION OF STATE POLICIES AND PROCEDURES
Approval protocols for treatment credits under the demonstration of performance toolbox option and for alternative ozone and chlorine dioxide CT values.	Proposed §142.16(n)(3)	
Determine that a system with an uncovered finished water reservoir has a risk mitigation plan that is adequate for purposes of waiving the requirement to cover or treat the reservoir.	Proposed §142.16(n)(4)	

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Appendix B

Regulatory Language

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List of Subjects

40 CFR Part 141

Environmental protection, Chemicals, Indians-lands, Intergovernmental relations, Radiation protection, Reporting and recordkeeping requirements, Water supply.

40 CFR Part 142

Environmental protection, Administrative practice and procedure, Chemicals, Indians-lands, Radiation protection, Reporting and recordkeeping requirements, Water supply.

Dated: July 11, 2003.

Linda J. Fisher,

Acting Administrator.

For the reasons set forth in the preamble, title 40 chapter I of the Code of Federal Regulations is proposed to be amended as follows:

PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

1. The authority citation for Part 141 continues to read as follows:

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

2. Section 141.2 is amended by adding, in alphabetical order, definitions for Bag filters, Bank filtration, Cartridge filters, Flowing stream, Lake/reservoir, Membrane filtration, Off-stream raw water storage, Plant intake, Presedimentation, and Two-stage lime softening to read as follows:

§ 141.2 Definitions.

* * * * *

Bag filters are pressure-driven separation devices that remove particulate matter larger than 1 μm using an engineered porous filtration media through either surface or depth filtration. Bag filters are typically constructed of a non-rigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to outside.

Bank filtration is a water treatment process that uses a pumping 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).

* * * * *

Cartridge filters are pressure-driven separation devices that remove particulate matter larger than 1 μm using an engineered porous filtration media through either surface or depth filtration. Cartridge filters 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.

* * * * *

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

* * * * *

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

* * * * *

Membrane filtration is a pressure-driven or vacuum-driven separation process in which particulate matter larger than 1 μm 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 (MF), ultrafiltration (UF), nanofiltration (NF), and reverse osmosis (RO).

* * * * *

Off-stream raw water storage refers to an impoundment in which water is stored prior to treatment and from which outflow is controlled.

* * * * *

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

* * * * *

Presedimentation is a preliminary unit process used to remove gravel, sand and other particulate material from the source water through settling before it enters the main treatment plant.

* * * * *

Two-stage lime softening refers to a process for the removal of hardness by the addition of lime and consisting of two distinct unit clarification processes in series prior to filtration.

* * * * *

3. Appendix A to Subpart Q of part 141 is amended in section I, Part A by adding entry number 10:

Subpart Q—Public Notification of Drinking Water Violations.

APPENDIX A TO SUBPART Q OF PART 141—NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE [1]

Contaminant	MCL/MRDL/TT violations [2]		Monitoring and testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
I. Violations of National Primary Drinking Water Regulations (NPDWR) [3]:				
A. Microbiological Contaminants				

APPENDIX A TO SUBPART Q OF PART 141—NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE [1]—Continued

Contaminant	MCL/MRDL/TT violations [2]		Monitoring and testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
* *	*	*	*	* *
10. LT2ESWTR violations	2	141.720–141.729	3	141.701–141.707; 141.711–141.713; 141.730
* *	*	*	*	* *

[1] Violations and other situations not listed in this table (*e.g.,* reporting violations and failure to prepare Consumer Confidence Reports) do not require notice, unless otherwise determined by the primary agency. Primary agencies may, at their option, also require a more stringent public notice tier (*e.g.,* Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Appendix, as authorized under § 141.202(a) and § 141.203(a).

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

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

4. Part 141 is amended by adding a new subpart W to read as follows:

Subpart W—Enhanced Filtration and Disinfection for *Cryptosporidium*

General Requirements

141.700 Applicability.
141.701 General requirements.

Source Water Monitoring Requirements

141.702 Source water monitoring.
141.703 Sampling schedules.
141.704 Sampling locations.
141.705 Analytical methods.
141.706 Requirements for use of an approved laboratory.
141.707 Reporting source water monitoring results.
141.708 Previously collected data.
141.709 Bin classification for filtered systems.

Disinfection Profiling and Benchmarking Requirements

141.710 [Reserved]
141.711 Determination of systems required to profile.
141.712 Schedule for disinfection profiling requirements.
141.713 Developing a profile.
141.714 Requirements when making a significant change in disinfection practice.

Treatment Technique Requirements

141.720 Treatment requirements for filtered systems.
141.721 Treatment requirements for unfiltered systems.
141.722 Microbial toolbox options for meeting ***Cryptosporidium*** treatment requirements.
141.723 [Reserved]
141.724 Requirements for uncovered finished water storage facilities.

Requirements for Microbial Toolbox Components

141.725 Source toolbox components.
141.726 Pre-filtration treatment toolbox components.
141.727 Treatment performance toolbox components.
141.728 Additional filtration toolbox components.
141.729 Inactivation toolbox components.

Reporting and Recordkeeping Requirements

141.730 Reporting requirements.
141.731 Recordkeeping requirements.

Subpart W—Enhanced Filtration and Disinfection for *Cryptosporidium*

General Requirements

§ 141.700 Applicability.

The requirements of this subpart apply to all subpart H systems. Failure to comply with any requirement of this subpart is a violation and requires public notification.

§ 141.701 General requirements.

(a) All subpart H systems, including wholesale systems, must characterize their source water to determine what (if any) additional treatment is necessary for *Cryptosporidium*, unless they meet the criteria in either paragraph (f) or (g) of this section.

(b) Systems serving at least 10,000 people that currently provide filtration or that are unfiltered and required to install filtration must conduct source water monitoring that includes *Cryptosporidium*, *E. coli*, and turbidity sampling and comply with the treatment requirements in § 141.720.

(c) Systems serving fewer than 10,000 people that currently provide filtration or that are unfiltered and required to install filtration must conduct source water monitoring consisting of *E. coli* sampling or sampling of an alternative indicator approved by the State. If the annual mean concentration of *E. coli* exceeds the levels specified in § 141.702(b), or if the level of a State-approved alternate indicator exceeds a State-approved alternative indicator trigger level, systems must conduct *Cryptosporidium* monitoring to complete the source water monitoring requirements and comply with the treatment requirements in § 141.720.

(d) Systems that are unfiltered and meet all the filtration avoidance criteria of § 141.71 must conduct source water monitoring consisting of *Cryptosporidium* sampling and comply with the treatment requirements in § 141.721.

(e) Systems must comply with the requirements in this subpart based on the schedule in the following table, except that systems are not required to conduct source water monitoring if they meet the criteria in paragraph (f) of this section for systems that currently provide filtration or that are unfiltered and required to install filtration or paragraph (g) of this section for systems that are unfiltered and meet all the filtration avoidance criteria of § 141.71:

COMPLIANCE REQUIREMENTS TABLE

Systems that are . . .	Must perform . . .[a,b]	And comply by . . .
(1) Subpart H systems serving ≥10,000 people that currently provide filtration or that are unfiltered and required to install filtration.	(i) 24 months of source water monitoring for *Cryptosporidium, E. coli* and turbidity at least once each month beginning no later than [Date 6 Months After Date of Publication of Final Rule in the **Federal Register**].	Submitting a monthly report to EPA no later than ten days after the end of the first month following the month when the sample is taken.
	(ii) Treatment technique implementation, if necessary.	Installing treatment and complying with the treatment technique no later than [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**][c].
(2) Subpart H systems serving ≥10,000 people that are unfiltered and meet the filtration avoidance criteria of § 141.71.	(i) 24 months of source water monitoring for *Cryptosporidium* at least once each month beginning no later than [Date 6 Months After Date of Publication of Final Rule in the **Federal Register**].	Submitting a monthly report to EPA no later than ten days after the end of the first month following the month when the sample is taken.
	(ii) Treatment technique implementation, if necessary.	Installing treatment and complying with the treatment technique no later than [Date 72 Months After Date of Publication of Final rule in the **Federal Register**][c].
(3) Subpart H systems serving <10,000 people that currently provide filtration or that are unfiltered and required to install filtration and are not required to monitor for *Cryptosporidium* based on *E. coli* or other indicator monitoring results[d].	12 months of source water monitoring for *E. coli* at least once every two weeks beginning no later than [Date 30 Months After Date of Publication of Final Rule in the **Federal Register**].	Submitting a monthly report to the State no later than ten days after the end of the first month following the month when the sample is taken.
(4) Subpart H systems serving <10,000 people that currently provide filtration or that are unfiltered and required to install filtration and must perform *Cryptosporidium* monitoring based on *E. coli* or other indicator monitoring results[d].	(i) 12 months of source water monitoring for *E. coli* at least once every two weeks beginning no later than [Date 30 Months After Date of Publication of Final Rule in the **Federal Register**] and 12 months of source water monitoring for *Cryptosporidium* at least twice each month beginning no later than [Date 48 Months After Date of Publication of Final Rule in the **Federal Register**].	Submitting a monthly report to the State no later than ten days after the end of the first month following the month when the sample is taken.
	(ii) Treatment technique implementation, if necessary.	Installing treatment and complying with the treatment technique no later than [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**][c].
(5) Subpart H systems serving <10,000 people that are unfiltered and meet the filtration avoidance criteria of § 141.71.	(i) 12 months of source water monitoring for *Cryptosporidium* at least twice each month beginning no later than [Date 48 Months After Date of Publication of Final Rule in the **Federal Register**].	Submitting a monthly report to the State no later than ten days after the end of the first month following the month when the sample is taken.
	(ii) Treatment technique implementation, if necessary.	Installing treatment and complying with the treatment technique no later than [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**][c].

[a] Any sampling performed more frequently than required must be evenly distributed over the sampling period.
[b] Systems may use data that meet the requirements in § 141.708 collected prior to the monitoring start date to substitute for an equivalent number of months at the end of the monitoring period.
[c] States may allow up to an additional two years for complying with the treatment technique requirement for systems making capital improvements.
[d] See § 141.702(b) to determine if *Cryptosporidium* monitoring is required.

(f) Systems that currently provide filtration or that are unfiltered and required to install filtration are not required to conduct source water monitoring under this subpart if the system currently provides or will provide a total of at least 5.5 log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of Bin 4 in § 141.720. Systems must notify the State not later than the date the system is otherwise required to submit a sampling schedule for monitoring under § 141.703 and must install and operate technologies to provide a total of at least 5.5 log of treatment for *Cryptosporidium* by the applicable date in paragraph (e) of this section.

(g) Systems that are unfiltered and meet all the filtration avoidance criteria of § 141.71 are not required to conduct source water monitoring under this subpart if the system currently provides or will provide a total of at least 3 log *Cryptosporidium* inactivation, equivalent to meeting the treatment requirements for unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L in § 141.721. Systems must notify the State not later than the date the system is otherwise required to submit a sampling schedule for monitoring under § 141.703. Systems must install and operate technologies to provide a total of at least 3 log *Cryptosporidium* inactivation by the applicable date in paragraph (e) of this section.

(h) Systems must comply with the uncovered finished water storage facility requirements in § 141.724 no later than [Date 36 Months After Date of Publication of Final Rule in the **Federal Register**].

Source Water Monitoring Requirements

§ 141.702 Source water monitoring.

(a) Systems must conduct initial source water monitoring as specified in § 141.701(b) through (f).

(b) Systems serving fewer than 10,000 people that provide filtration or that are unfiltered and required to install filtration must perform *Cryptosporidium* monitoring in accordance with § 141.701(e) if they meet any of the criteria in paragraphs (b)(1) through (4) of this section.

(1) For systems using lake/reservoir sources, an annual mean *E. coli* concentration greater than 10 *E. coli*/100 mL, based on monitoring conducted under this section, unless the State approves an alternative indicator trigger.

(2) For systems using flowing stream sources, an annual mean *E. coli* concentration greater than 50 *E. coli*/100 mL, based on monitoring conducted under this section, unless the State approves an alternative indicator trigger.

(3) If the State approves an alternative to the indicator trigger in paragraph (b)(1) or (b)(2) of this section, an annual concentration that exceeds a State-approved trigger level, including an alternative *E. coli* level, based on monitoring conducted under this section.

(4) The system does not conduct *E. coli* or other State-approved indicator monitoring as specified in § 141.701(e).

(c) Systems may submit *Cryptosporidium* data collected prior to the monitoring start date to meet the initial source water monitoring requirements of paragraphs (a) through (b) of this section. Systems may also use *Cryptosporidium* data collected prior to the monitoring start date to substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this paragraph must meet the requirements in § 141.708.

(d) Systems must conduct a second round of source water monitoring in accordance with the requirements in § 141.701(b) through (e) of this section, beginning no later than the dates specified in paragraphs (d)(1) through (3) of this section, unless they meet the criteria in either paragraph § 141.701(f) or (g).

(1) Systems that serve at least 10,000 people must begin a second round of source water monitoring no later than [Date 108 Months After Date of Publication of Final Rule in the **Federal Register**].

(2) Systems serving fewer than 10,000 people that provide filtration or that are unfiltered and required to install filtration must begin a second round of source water monitoring no later than [Date 138 Months After Date of Publication of Final Rule in the **Federal Register**] and, if required to monitor for *Cryptosporidium* under paragraph (b) of this section, must begin *Cryptosporidium* monitoring no later than [Date 156 Months After Date of Publication of Final Rule in the **Federal Register**].

(3) Systems serving fewer than 10,000 people that are unfiltered and meet the filtration avoidance requirements of § 141.71 must begin a second round of source water monitoring no later than [Date 156 Months After Date of Publication of Final Rule in the **Federal Register**].

§ 141.703 Sampling schedules.

(a) Systems required to sample under § § 141.701 through 141.702 must submit a sampling schedule that specifies the calendar dates that all required samples will be taken.

(1) Systems serving at least 10,000 people must submit their sampling schedule for initial source water monitoring to EPA electronically at [insert Internet address] no later than [Date 3 Months After Date of Publication of Final Rule in the **Federal Register**].

(2) Systems serving fewer than 10,000 people that are filtered or that are unfiltered and required to install filtration must submit a sampling schedule for initial source water monitoring of *E. coli* or an alternative State-approved indicator to the State no later than [Date 27 Months After Date of Publication of Final Rule in the **Federal Register**].

(3) Filtered systems serving fewer than 10,000 people that are required to conduct *Cryptosporidium* monitoring and unfiltered systems serving fewer than 10,000 people must submit a sampling schedule for initial source water *Cryptosporidium* monitoring to the State no later than [Date 45 Months After Date of Publication of Final Rule in the **Federal Register**].

(4) Systems must submit a sampling schedule for the second round of source water monitoring to the State no later than 3 months prior to the date the system is required to begin the second round of monitoring under § 141.702(d).

(b) Systems must collect samples within two days of the dates indicated in their sampling schedule.

(c) If extreme conditions or situations exist that may pose danger to the sample collector, or which are unforeseen or cannot be avoided and which cause the system to be unable to sample in the required time frame, the system must sample as close to the required date as feasible and submit an explanation for the alternative sampling date with the analytical results.

(d) Systems that are unable to report a valid *Cryptosporidium* analytical result for a scheduled sampling date due to failure to comply with the analytical method requirements, including the quality control requirements in § 141.705, must collect a replacement sample within 14 days of being notified by the laboratory or the State that a result cannot be reported for that date and must submit an explanation for the replacement sample with the analytical results.

§ 141.704 Sampling locations.

(a) Unless specified otherwise in this section, systems required to sample under §§ 141.701 through 141.702 must collect source water samples from the plant intake prior to any treatment. Where treatment is applied in an intake pipe such that sampling in the pipe prior to treatment is not feasible, systems must collect samples as close to the intake as is feasible, at a similar depth and distance from shore.

(b) *Presedimentation.* Systems using a presedimentation basin must collect source water samples after the presedimentation basin but before any other treatment. Use of presedimentation basins during monitoring must be consistent with routine operational practice and the State may place reporting requirements to verify operational practices. Systems collecting samples after a presedimentation basin may not receive credit for the presedimentation basin under § 141.726(a).

(c) *Raw water off-stream storage.* Systems using an off-stream raw water storage reservoir must collect source water samples after the off-stream storage reservoir. Use of off-stream storage during monitoring must be consistent with routine operational practice and the State may place reporting requirements to verify operational practices.

(d) *Bank filtration.* The required sampling location for systems using bank filtration differs depending on whether the bank filtered water is treated by subsequent filtration for compliance with § 141.173(b) or § 141.552(a), as applicable.

(1) Systems using bank filtered water that is treated by subsequent filtration for compliance with § 141.173(b) or § 141.552(a), as applicable, must collect source water samples from the well (*i.e.*, after bank filtration), but before any other treatment. Use of bank filtration during monitoring must be consistent with routine operational practice and the State may place reporting

requirements to verify operational practices. Systems collecting samples after a bank filtration process may not receive credit for the bank filtration under § 141.726(c).

(2) Systems using bank filtration as an alternative filtration demonstration to meet their *Cryptosporidium* removal requirements under § 141.173(b) or § 141.552(a), as applicable, must collect source water samples in the surface water (*i.e.*, prior to bank filtration).

(3) Systems using a ground water source under the direct influence of surface water that meet all the criteria for avoiding filtration in § 141.71 and that do not provide filtration treatment must collect source water samples from the ground water (*e.g.*, the well).

(e) *Multiple sources.* Systems with plants that use multiple water sources at the same time, including multiple surface water sources and blended surface water and ground water sources, must collect samples as specified in paragraph (e)(1) or (2) of this section. The use of multiple sources during monitoring must be consistent with routine operational practice and the State may place reporting requirements to verify operational practices.

(1) If a sampling tap is available where the sources are combined prior to treatment, the sample must be collected from the tap.

(2) If there is not a sampling tap where the sources are combined prior to treatment, systems must collect samples at each source near the intake on the same day and must follow either paragraph (e)(2)(i) or (e)(2)(ii) of this section for sample analysis.

(i) Composite samples from each source into one sample prior to analysis. In the composite, the volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.

(ii) Analyze samples from each source separately as specified in § 141.705, 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.

§ 141.705 Analytical methods.

(a) *Cryptosporidium.* Systems must use Method 1622 *Cryptosporidium in Water by Filtration/IMS/FA*, EPA 821–R–01–026, April 2001, or Method 1623 *Cryptosporidium and Giardia in Water by Filtration/IMS/FA*, EPA 821–R–01–025, April 2001, for *Cryptosporidium* analysis.

(1) Systems are required to analyze at least a 10 L sample or a packed pellet volume of at least 2 mL as generated by the methods listed in paragraph (a) of this section. Systems unable to process a 10 L sample must analyze as much sample volume as can be filtered by two filters approved by EPA for the methods listed in paragraph (a) of this section, up to a packed pellet volume of 2 mL.

(2)(i) Matrix spikes (MS) samples as required by the methods in paragraph (a) of this section must be spiked and filtered by a laboratory approved for *Cryptosporidium* analysis under § 141.706. The volume of the MS sample must be within 10 percent of the volume of the unspiked sample that is collected at the same time, and the samples must be collected by splitting the sample stream or collecting the samples sequentially. The MS sample and the associated unspiked sample must be analyzed by the same procedure.

(ii) If the volume of the MS sample is greater than 10 L, the system is permitted to filter all but 10 L of the MS sample in the field, and ship the filtered sample and the remaining 10 L of source water to the laboratory. In this case, the laboratory must spike the remaining 10 L of water and filter it through the filter used to collect the balance of the sample in the field.

(3) Each sample batch must meet the quality control criteria for the methods listed in paragraph (a) of this section. Flow cytometer-counted spiking suspensions must be used for MS samples and ongoing precision and recovery (OPR) samples; recovery for OPR samples must be 11% to 100%; for each method blank, oocysts must not be detected.

(4) Total *Cryptosporidium* oocysts as detected by fluorescein isothiocyanate (FITC) must be reported as determined by the color (apple green or alternative stain color approved under § 141.706(a) for the laboratory), size (4–6 μm) and shape (round to oval). This total includes all of the oocysts identified, less any atypical organisms identified by FITC, differential interference contrast (DIC) or 4′,6-diamindino-2-phenylindole (DAPI), including those possessing spikes, stalks, appendages, pores, one or two large nuclei filling the cell, red fluorescing chloroplasts, crystals, and spores.

(b) *E. coli.* Systems must use the following methods listed in this paragraph for enumeration of *E. coli* in source water (table will be replaced with CFR cite from Guidelines Establishing Test Procedures for the Analysis of Pollutants; Analytical Methods for Biological Pollutants in Ambient Water when finalized—expected 2003):

METHODS FOR *E. coli* ENUMERATION [1]

Technique	Method [1]	EPA	VCSB methods		
			Standard methods	ASTM	AOAC
Most Probable Number (MPN)	LTB, EC–MUG		9221B.1/9221F		
	ONPG–MUG		9223B		991.15
	ONPG–MUG		9223B		
Membrane Filter (MF)	mFC→NA–MUG		9222D/9222G		
	ENDO→NA–MUG		9222B/9222G		
	mTEC agar	1103.1	9213D	D5392–93	
	Modified mTEC agar	Modified 1103.1			
	MI agar	EPA–600–R–013			
	m-ColiBlue24 broth				

[1] Tests must be conducted in a format that provides organism enumeration.

(1) The time from sample collection to initiation of analysis may not exceed 24 hours. Systems must maintain samples between 0°C and 10°C during transit.

(2) [Reserved]

(c) *Turbidity.* Systems must use methods for turbidity measurement approved in § 141.74.

§ 141.706 Requirements for use of an approved laboratory.

(a) *Cryptosporidium*. Systems must have *Cryptosporidium* samples analyzed by a laboratory that has passed a quality assurance evaluation under EPA's Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water or a laboratory that has been certified for *Cryptosporidium* analysis by an equivalent State laboratory certification program.

(b) *E. coli*. Any laboratory certified by the EPA, the National Environmental Laboratory Accreditation Conference or the State for total coliform or fecal coliform analysis in source water under § 141.74 is deemed approved for *E. coli* analysis under this subpart when the laboratory uses the same technique for *E. coli* that the laboratory uses for source water in § 141.74.

(c) Turbidity. Measurements of turbidity must be made by a party approved by the State.

§ 141.707 Reporting source water monitoring results.

(a) All systems serving at least 10,000 people must submit the results of all initial source water monitoring required under § 141.702(a) to EPA electronically at [insert Internet address]. Systems that do not have the ability to submit data electronically may use an alternative format approved by EPA.

(b) Systems serving fewer than 10,000 people must submit the results of all initial source water monitoring required under § 141.702(a)–(b) to the State.

(c) All systems must submit the results from the second round of source water monitoring required under § 141.702(d) to the State.

(d) Source water monitoring analysis results must be submitted not later than ten days after the end of first month following the month when the sample is collected. The submission must include the applicable information in paragraphs (e)(1) and (2) of this section.

(e)(1) Systems must report the following data elements for each *Cryptosporidium* analysis:

(i) PWS ID
(ii) Facility ID
(iii) Sample collection point
(iv) Sample collection date
(v) Sample type (field or matrix spike)
(vi) Sample volume filtered (L), to nearest ¼ L
(vii) Was 100% of filtered volume examined
(viii) Number of oocysts counted

(i) For matrix spike samples, systems must also report the sample volume spiked and estimated number of oocysts spiked. These data are not required for field samples.

(ii) For samples in which less than 10 L is filtered or less than 100% of the sample volume is examined, systems must also report the number of filters used and the packed pellet volume.

(iii) For samples in which less than 100% of sample volume is examined, systems must also report the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.

(2) Systems must report the following data elements for each *E. coli* analysis:

(i) PWS ID
(ii) Facility ID
(iii) Sample collection point
(iv) Sample collection date
(v) Analytical method number
(vi) Method type
(vii) Source type
(viii) *E. coli*/100 mL
(ix) Turbidity (Systems serving fewer than 10,000 people that are not required to monitor for turbidity under § 141.701(c) are not required to report turbidity with their *E. coli* results.)

§ 141.708 Previously collected data.

(a) Systems may comply with the initial monitoring requirements of § 141.702(a) using *Cryptosporidium* data collected before the system is required to begin monitoring if the system meets the conditions in paragraphs (b) through (h) of this section and EPA notifies the system that the data are acceptable.

(b) To be accepted, previously collected *Cryptosporidium* data must meet the conditions in paragraphs (b)(1) through (5) of this section.

(1) Samples were analyzed by laboratories using one of the analytical methods in paragraphs (b)(1)(i) through (iv) of this section.

(i) *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, 2001, EPA–821–R–01–025.*

(ii) *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 2001, EPA–821–R–01–026.*

(iii) *Method 1623: Cryptosporidium and Giardia in Water by Filtration/IMS/FA, 1999, EPA–821–R–99–006.*

(iv) *Method 1622: Cryptosporidium in Water by Filtration/IMS/FA, 1999, EPA–821–R–99–001.*

(2) Samples were collected no less frequently than each calendar month on a regular schedule, beginning no earlier than January 1999.

(3) Samples were collected in equal intervals of time over the entire collection period (*e.g.*, weekly, monthly). Sample collection interval may vary for the conditions specified in § 141.703(c) and (d) if the system provides documentation of the condition.

(4) Samples met the conditions for sampling location specified in § 141.704. The system must report the use of bank filtration, presedimentation, and raw water off-stream storage during sampling.

(5) For each 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 approved by EPA for the methods listed in paragraph (b)(1) of this section, up to a packed pellet volume of 2 mL.

(c) The system must submit a letter to EPA concurrent with the submission of previously collected data certifying that the data meet the conditions in paragraphs (c)(1) and (2) of this section.

(1) The reported *Cryptosporidium* analysis results include all results generated by the system during the time period beginning with the first reported result and ending with the final reported result. This applies to samples that were collected from the sampling location specified for source water monitoring under this subpart, not spiked, and analyzed using the laboratory's routine process for the analytical methods listed in paragraph (a)(1) of this section.

(2) The samples were representative of a plant's source water(s) and the source water(s) have not changed.

(d) For each sample, the system must report the data elements in § 141.707(e)(1).

(e) The laboratory or laboratories that generated the data must submit a letter to EPA concurrent with the submission of previously collected data certifying that the quality control criteria specified in the methods listed in paragraph (b)(1) of this section were met for each sample batch associated with the previously collected data. 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 previously collected data.

(f) If a system has at least two years of *Cryptosporidium* data collected before [Date of Publication of Final Rule in the **Federal Register**] and the system intends to use these data to comply with the initial source water monitoring required under § 141.702(a) in lieu of conducting new monitoring, the system must submit to EPA, no later than [Date 2 Months After Date of Publication of Final Rule in the **Federal Register**], the previously collected data and the supporting information specified in this section. EPA will notify the system by [Date 4 Months After Date of Publication of Final Rule in the **Federal Register**] as to whether the data are acceptable. If EPA does not notify the system that the

submitted data are acceptable, the system must carry out initial source water as specified in § § 141.701 through 141.707 until EPA notifies the system that it has at least two years of acceptable data.

(g) If a system has fewer than two years of *Cryptosporidium* data collected before [Date of Publication of Final Rule in the **Federal Register**] and the system intends to use these data to meet, in part, the initial source water monitoring required under § 141.702(a), the system must submit to EPA, no later than [Date 8 Months After Date of Publication of Final Rule in the **Federal Register**], the previously collected data and the supporting information specified in this section. The system must carry out initial source water monitoring according to the requirements in §§ 141.701 through 141.707 until EPA notifies the system that it has at least two years of acceptable data.

(h) If a system has two or more years of previously collected data and the system intends to use these data to comply with the initial source water monitoring required under § 141.702(a), but the system also intends to carry out additional initial source water monitoring in order to base its determination of average *Cryptosporidium* concentration under § 141.709 or § 141.721 on more than two years of monitoring data, the system must submit to EPA, no later than [Date 8 Months After Date of Publication of Final Rule in the **Federal Register**], the previously collected data and the supporting information specified in this section. The system must carry out initial source water monitoring according to the requirements in § § 141.701 through 141.707 until EPA notifies the system that it has at least two years of acceptable data.

§ 141.709 Bin classification for filtered systems.

(a) Following completion of the initial source water monitoring required under § 141.702(a), filtered systems and unfiltered systems that are required to install filtration must calculate their initial *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under § 141.702(a), along with any previously collected data that satisfy the requirements of § 141.708, and following the procedures in paragraphs (b)(1) through (3) of this section.

(b)(1) For systems that collect a total of at least 48 samples, the *Cryptosporidium* bin concentration is equal to the arithmetic mean of all sample concentrations.

(2) For systems that serve at least 10,000 people and collect a total of at least 24 samples, but not more than 47 samples, the *Cryptosporidium* bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.

(3) For systems that serve fewer than 10,000 people and take at least 24 samples, the *Cryptosporidium* bin concentration is equal to the arithmetic mean of all sample concentrations.

(c) Filtered systems and unfiltered systems that are required to install filtration must determine their initial bin classification from the following table and using the *Cryptosporidium* bin concentration calculated under paragraph (a) of this section:

BIN CLASSIFICATION TABLE FOR FILTERED SYSTEMS

For systems that are:	With a *Cryptosporidium* bin concentration of . . .[1]	The bin classification is . . .
* * * required to monitor for *Cryptosporidium* under §§ 141.701 to 141.702.	*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 § 142.702(b).	NA	Bin 1

[1] Based on calculations in paragraph (a) or (d) of this section, as applicable.

(d) Following completion of the second round of source water monitoring required under § 141.702(d), filtered systems and unfiltered systems that are required to install filtration must recalculate their *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under § 141.702(d) and following the procedures in paragraphs (b)(1) through (3) of this section. Systems must then determine their bin classification a second time using this *Cryptosporidium* bin concentration and the table in paragraph (c) of this section.

(e) Any filtered system or unfiltered system that is required to install filtration that fails to complete the monitoring requirements of § § 141.701 through 141.707 or choses not to monitor pursuant to § 141.701(f) must meet the treatment requirements for Bin 4 under § 141.720 by the date applicable under § 141.701(e).

Disinfection Profiling and Benchmarking Requirements

§ 141.710 [Reserved].

§ 141.711 Determination of systems required to profile.

(a) Subpart H of this part community and nontransient noncommunity water systems serving at least 10,000 people that do not have at least 5.5 log of *Cryptosporidium* treatment, equivalent to compliance with Bin 4 in § 141.720, in place prior to the date when the system is required to begin profiling in § 141.712 are required to develop *Giardia lamblia* and virus disinfection profiles.

(b) Subpart H community and nontransient noncommunity water systems serving fewer than 10,000 people that do not have at least 5.5 log of *Cryptosporidium* treatment, equivalent to compliance with Bin 4 in § 141.720, in place prior to the date when the system is required to begin profiling in § 141.712 are required to develop *Giardia lamblia* and virus disinfection profiles if any of the criteria in paragraphs (b)(1) through (3) of this section apply.

(1) TTHM levels in the distribution system are at least 0.064 mg/L as a locational running annual average (LRAA) at any monitoring site. Systems must base their TTHM LRAA calculation on data collected for compliance under subpart L of this part after [Date of Publication of Final Rule in the **Federal Register**], or as determined by the State.

(2) HAA5 levels in the distribution system are at least 0.048 mg/L as an LRAA at any monitoring site. Systems must base their HAA5 LRAA calculation on data collected for compliance under subpart L of this part after [Date of Publication of Final Rule in the **Federal Register**], or as determined by the State.

(3) The system is required to monitor for *Cryptosporidium* under § 141.701(c).

(c) In lieu of developing a new profile, systems may use the profile(s) developed under § 141.172 or § § 141.530 through 141.536 if the profile(s) meets the requirements of § 141.713(c).

§ 141.712 Schedule for disinfection profiling requirements.

(a) Systems must comply with the following schedule in the table in this paragraph:

SCHEDULE OF REQUIRED DISINFECTION PROFILING MILESTONES [1]

Activity	Date		
	Subpart H systems serving at least 10,000 people	Subpart H systems serving fewer than 10,000 people	
		Required to monitor for *Cryptosporidium*	Not required to monitor for *Cryptosporidium*
1. Report TTHM and HAA5 LRAA results to State.	NA	NA	[Date 42 Months After Date of Publication of Final Rule in the **Federal Register**].
2. Begin disinfection profiling [1,2]	[Date 24 Months After Date of Publication of Final Rule in the **Federal Register**].	[Date 54 Months After Date of Publication of Final Rule in the **Federal Register**].	[Date 42 Months After Date of Publication of Final Rule in the **Federal Register**] if required [3].
3. Complete disinfection profiling based on at least one year of data.	[Date 36 Months After Date of Publication of Final Rule in the **Federal Register**].	[Date 66 Months After Date of Publication of Final Rule in the **Federal Register**].	[Date 54 Months After Date of Publication of Final Rule in the **Federal Register**] if required [3].

[1] Systems with at least 5.5 log of *Cryptosporidium* treatment in place are not required to do disinfection profiling.
[2] Systems may use existing operational data and profiles as described in § 141.713(c).
[3] Systems serving fewer than 10,000 people are not required to conduct disinfection profiling if they are not required to monitor for *Cryptosporidium* and if their TTHM and HAA5 LRAAs do not exceed the levels specified in § 141.711(b).

(b) [Reserved]

§ 141.713 Developing a profile.

(a) Systems required to develop disinfection profiles under § 141.711 must follow the requirements of this section. Systems must monitor at least weekly for a period of 12 consecutive months to determeine the total log inactivation for *Giardia lamblia* and viruses. Systems must determine log inactivation for *Giardia lamblia* through the entire plant, based on $CT_{99.9}$ values in Tables 1.1 through 1.6, 2.1 and 3.1 of § 141.74(b) as applicable. Systems must determine log inactivation for viruses through the entire treatment plant based on a protocol approved by the State.

(b) Systems with a single point of disinfectant application prior to the entrance to the distribution system must conduct the monitoring in paragraphs (b)(1) through (4) of this section. Systems with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(1) through (4) of this section for each disinfection segment. Systems must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in § 141.74(a).

(1) For systems using a disinfectant other than UV, the temperature of the disinfected water must be measured at each residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.

(2) For systems using chlorine, the pH of the disinfected water must be measured at each chlorine residual disinfectant concentration sampling point during peak hourly flow or at an alternative location approved by the State.

(3) The disinfectant contact time(s) (T) must be determined during peak hourly flow.

(4) The residual disinfectant concentration(s) (C) of the water before or at the first customer and prior to each additional point of disinfection must be measured during peak hourly flow.

(c) In lieu of conducting new monitoring under paragraph (b) of this section, systems may elect to meet the requirements of paragrphs (c)(1) or (2) of this section.

(1) Systems that have at least 12 consecutive months of existing operational data that are substantially equivalent to data collected under the provisions of paragraph (b) of this section may use these data to develop disinfection profiles as specified in this section if the system has neither made a significant change to its treatment practice nor changed sources since the data were collected. Systems using existing operational data may develop disinfection profiles for a period of up to three years.

(2) Systems may use disinfection profile(s) developed under § 141.172 or §§ 141.530 through 141.536 in lieu of developing a new profile if the system has neither made a significant change to its treatment practice nor changed sources since the profile was developed. Systems that have not developed a virus profile under § 141.172 or §§ 141.530 through 141.536 must develop a virus profile using the same monitoring data on which the *Giardia lamblia* profile is based.

(d) Systems must calculate the total inactivation ratio for *Giardia lamblia* as specified in paragraphs (d)(1) through (3) of this section.

(1) Systems using only one point of disinfectant application may determine the total inactivation ratio for the disinfection segment based on either of the methods in paragraph (d)(1)(i) or (ii) of this section.

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

(ii) Determine successive $CTcalc/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. The system must calculate the total inactivation ratio by determining ($CTcalc/CT_{99.9}$) for each sequence and then adding the ($CTcalc/CT_{99.9}$) values together to determine (Σ ($CTcalc/CT_{99.9}$)).

(2) Systems using more than one point of disinfectant application before the first customer must determine the CT value of each disinfection segment immediately prior to the next point of

disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The (CTcalc/$CT_{99.9}$) value of each segment and (Σ(CTcalc/$CT_{99.9}$)) must be calculated using the method in paragraph (d)(1)(ii) of this section.

(3) The system must determine the total logs of inactivation by multiplying the value calculated in paragraph (d)(1) or (d)(2) of this section by 3.0.

(4) Systems must calculate the log of inactivation for viruses using a protocol approved by the State.

(5) Systems must retain the 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.

§ 141.714 Requirements when making a significant change in disinfection practice.

(a) A system that is required to develop a disinfection profile under the provisions of this subpart and that plans to make a significant change to its disinfection practice must calculate a disinfection benchmark and must notify the State prior to making such a change. Significant changes to disinfection practice are defined in paragraphs (a)(1) through (4) of this section.

(1) Changes to the point of disinfection;

(2) Changes to the disinfectant(s) used in the treatment plant;

(3) Changes to the disinfection process; and

(4) Any other modification identified by the State.

(5) Systems must use the procedures specified in paragraphs (a)(5)(i) and (ii) of this section to calculate a disinfection benchmark.

(i) For the year of profiling data collected and calculated under § 141.713, or for each year with profiles covering more than one year, 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.

(ii) 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.

(6) Systems must submit the information in paragraphs (a)(6)(i) through (iii) of this section when notifying the State that they are planning to make a significant change in disinfection practice.

(i) A description of the proposed change.

(ii) The disinfection profile and benchmark for *Giardia lamblia* and viruses determined under §§ 141.713 and 141.714.

(iii) An analysis of how the proposed change will affect the current level of disinfection.

Treatment Technique Requirements

§ 141.720 Treatment requirements for filtered systems.

(a) Filtered systems or systems that are unfiltered and required to install filtration must provide the level of treatment for *Cryptosporidium* specified in this paragraph, based on their bin classification as determined under § 141.709 and their existing treatment:

If the system bin classification is . . .	And the system uses the following filtration treatment in full compliance with subpart H, P, and T of this section (as applicable), then the additional treatment requirements are . . .			
	Conventional filtration treatment (including softening)	Direct filtration	Slow sand or diatomaceous earth filtration	Alternative filtration technologies
(1) Bin 1	No additional treatment	No additional treatment	No additional treatment	No additional treatment
(2) Bin 2	1 log treatment	1.5 log treatment	1 log treatment	([1])
(3) Bin 3	2 log treatment	2.5 log treatment	2 log treatment	([2])
(4) Bin 4	2.5 log treatment	3 log treatment	2.5 log treatment	([3])

[1] As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 4.0 log.
[2] As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 5.0 log.
[3] As determined by the State such that the total *Cryptosporidium* removal and inactivation is at least 5.5 log.

(b) Filtered systems must use one, or a combination, of the management and treatment options listed in § 141.722, termed the microbial toolbox, to meet the additional *Cryptosporidium* treatment requirements identified for each bin in paragraph (a) of this section.

(c) Systems classified in Bin 3 and Bin 4 must achieve at least 1 log of the additional treatment required under paragraph (a) of this section using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, and/or UV as specified in § 141.722.

§ 141.721 Treatment requirements for unfiltered systems.

(a) Following completion of the initial source water monitoring required under § 141.702(a), unfiltered systems that meet all filtration avoidance criteria of § 141.71 must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under § 141.702(a), along with any previously collected data that satisfy the requirements of § 141.708, and must meet the treatment requirements in paragraph (b)(1) or (2) of this section, as applicable, based on this concentration.

(b)(1) Unfiltered systems with a mean *Cryptosporidium* concentration of 0.01 oocysts/L or less must provide at least 2 log *Cryptosporidium* inactivation.

(2) Unfiltered systems with a mean *Cryptosporidium* concentration of greater than 0.01 oocysts/L must provide at least 3 log *Cryptosporidium* inactivation.

(c) Unfiltered systems must use chlorine dioxide, ozone, or UV as specified in § 141.722 to meet the *Cryptosporidium* inactivation requirements of this section.

(1) Unfiltered systems that use chlorine dioxide or ozone and fail to achieve the *Cryptosporidium* log inactivation required in paragraph (b)(1) or (2) of this section, as applicable, on more than one day in the calendar month are in violation of the treatment technique requirement.

(2) Unfiltered systems that use UV light and fail to achieve the *Cryptosporidium* log inactivation required in paragraph (b)(1) or (2) of this section, as applicable, in at least 95% of the water that is delivered to the public during each calendar month, based on monitoring required under paragraph § 141.729(d)(4), are in violation of the treatment technique requirement.

(d) Unfiltered systems must meet the combined *Cryptosporidium*, *Giardia*

lamblia, and virus inactivation requirements of this section and § 141.72(a) using a minimum of two disinfectants, and each disinfectant must separately achieve the total inactivation required for either *Cryptosporidium*, *Giardia lamblia*, or viruses.

(e) Following completion of the second round of source water monitoring required under § 141.702(d), unfiltered systems that meet all filtration avoidance criteria of § 141.71 must calculate the arithmetic mean of all *Cryptosporidium* sample concentrations reported under § 141.702(d) and must meet the treatment requirements in paragraph (b)(1) or (2) of this section, as applicable, based on this concentration.

(f) Any unfiltered system that meets all filtration avoidance criteria of § 141.71 and fails to complete the monitoring requirements of § § 141.701 through 141.707 or choses not to monitor pursuant to § 141.701(g) must meet the treatment requirements of paragraph (b)(2) of this section by the date applicable under § 141.701(e).

§ 141.722 Microbial toolbox options for meeting *Cryptosporidium* treatment requirements.

(a) To meet the additional *Cryptosporidium* treatment requirements of § § 141.720 and 141.721, systems must use microbial toolbox options listed in this follwing table that are designed, implemented, and operated in accordance with the requirements of this subpart.

MICROBIAL TOOLBOX: OPTIONS, CREDITS AND CRITERIA

Toolbox option	Proposed *Cryptosporidium* treatment credit with design and implementation criteria
Source Toolbox Components	
(1) Watershed control program	0.5 log credit for State approved program comprising EPA specified elements. Specific criteria are in § 141.725(a).
(2) Alternative source/intake management.	Bin classification based on concurrent *Cryptosporidium* monitoring. No presumptive credit. Specific criteria are in § 141.725(b).
Pre-Filtration Toolbox Components	
(3) Presedimentation basin with coagulation.	0.5 log credit for new basins with continuous operation and coagulant addition. No presumptive credit for basins existing when monitoring is required under § 141.702. Specific criteria are in § 141.726(a).
(4) Two-stage lime softening	0.5 log credit for two-stage softening with coagulant addition. Specific criteria are in § 141.726(b).
(5) Bank filtration	0.5 log credit for 25 foot setback; 1.0 log credit for 50 foot setback. No presumptive credit for bank filtration existing when monitoring is required under § 141.704(d)(1). Specific criteria are in § 141.726(c).
Treatment Performance Toolbox Components	
(6) Combined filter performance	0.5 log credit for combined filter effluent turbidity ≤ 0.15 NTU in 95% of samples each month. Specific criteria are in § 141.727(a).
(7) Individual filter performance	1.0 log credit for individual filter effluent turbidity ≤0.1 NTU in 95% of daily maximum samples each month and no filter >0.3 NTU in two consecutive measurements. Specific criteria are in § 141.727(b).
(8) Demonstration of performance	Credit based on a demonstration to the State through State approved protocol. Specific criteria are in § 141.727(c).
Additional Filtration Toolbox Components	
(9) Bag filters	1 log credit with demonstration of at least 2 log removal efficiency in challenge test; Specific criteria are in § 141.728(a).
(10) Cartridge filters	2 log credit with demonstration of at least 3 log removal efficiency in challenge test; Specific criteria are in § 141.728(a).
(11) Membrane filtration	Log removal credit up to the lower value of the removal efficiency demonstrated during the challenge test or verified by the direct integrity test applied to the system. Specific criteria are in § 141.728(b).
(12) Second stage filtration	0.5 log credit for a second separate filtration stage in treatment process following coagulation. Specific criteria are in § 141.728(c).
(13) Slow sand filers	2.5 log credit for second separate filtration process. Specific criteria are in § 141.728(d).
Inactivation Toolbox Components	
(14) Chlorine dioxide	Log credit based on demonstration of compliance with CT table. Specific criteria are in § 141.729(b).
(15) Ozone	Log credit based on demonstration of compliance with CT table. Specific criteria are in § 141.729(c).
(16) UV	Log credit based on demonstration of compliance with UV dose table. Specific criteria are in § 141.729(d).

(b) Failure to comply with the requirements of this section in accordance with the schedule in § 141.701(e) is a treatment technique violation.

§ 141.723 [Reserved]

§ 141.724 Requirements for uncovered finished water storage facilities.

(a) Systems using uncovered finished water storage facilities must comply with the conditions of one of the paragraphs (a)(1) through (3) of this section for each facility no later than the date specified in § 141.701(h).

(1) Systems must cover any uncovered finished water storage facility.

(2) Systems must treat the discharge from the uncovered finished water storage facility to the distribution system to achieve at least 4 log virus inactivation using a protocol approved by the State.

(3) Systems must have a State-approved risk mitigation plan for the uncovered finished water storage facility that addresses physical access and site security, surface water runoff, animal and bird waste, and ongoing water quality assessment, and includes a schedule for plan implementation. Systems must implement the risk

mitigation plan approved by the State. Systems must submit risk mitigation plans to the State for approval no later than [Date 24 Months After Date of Publication of Final Rule in the **Federal Register**].

(b) Failure to comply with the requirements of this section in accordance with the schedule in § 141.701(h) is a treatment technique violation.

Requirements for Microbial Toolbox Components

§ 141.725 Source toolbox components.

(a) Watershed control program.

(1) Systems that intend to qualify for a 0.5 log credit for *Cryptosporidium* removal for a watershed control program must notify the State no later than one year after completing the source water monitoring requirements of § 141.702(b) that they intend to develop a watershed control program and to submit it for State approval.

(2) Systems must submit a proposed initial watershed control plan and a request for plan approval and 0.5 log *Cryptosporidium* removal credit to the State no later than two years after completing the source water monitoring requirements of § 141.702(b). Based on a review of the initial proposed watershed control plan, the State may approve, reject, or conditionally approve the plan. If the plan is approved, or if the system agrees to implement the State's conditions for approval, the system is awarded a 0.5 log credit for *Cryptosporidium* removal to apply against additional treatment requirements.

(3) The application to the State for initial program approval must include elements in paragraphs (a)(3)(i) through (iii) of this section.

(i) An analysis of the vulnerability of each source to *Cryptosporidium*. The vulnerability analysis must address the watershed upstream of the drinking water intake and must include the following: a characterization of the watershed hydrology, identification of an ''area of influence'' (the area to be considered in future watershed surveys) outside of which there is no significant probability of *Cryptosporidium* or fecal contamination affecting the drinking water intake, identification of both potential and actual sources of *Cryptosporidium* contamination, the relative impact of the sources of *Cryptosporidium* contamination on the system's source water quality, and an estimate of the seasonal variability of such contamination.

(ii) An analysis of control measures that could mitigate the sources of *Cryptosporidium* contamination identified during the vulnerability analysis. The analysis of control measures must address their relative effectiveness in reducing *Cryptosporidium* loading to the source water and their feasability and sustainability.

(iii) A plan that establishes goals and defines and prioritizes specific actions 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 role(s), identify resource requirements and commitments, and include a schedule for plan implementation.

(4) Initial State approval of a watershed control plan and its associated 0.5 log *Cryptosporidium* removal credit is valid until the system completes the second round of *Cryptosporidium* monitoring required under § 141.702(d). Systems must complete the actions in paragraphs (a)(4)(i) through (iv) of this section to maintain State approval and the 0.5 log credit.

(i) Submit an annual watershed control program status report to the State by a date determined by the State. The annual watershed control program status report must describe the system's implementation of the approved plan and assess the adequacy of the plan to meet its goals. It must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the State or as the result of the watershed survey conducted under paragraph (a)(4)(ii) of this section. If it becomes necessary during implementation to make substantial changes in its approved watershed control program, the system must notify the State and provide a rationale prior to making any such changes. If any change is likely to reduce the level of source water protection, the system must also include the actions it will take to mitigate the effects in its notification.

(ii) Conduct an annual watershed sanitary survey and submit the survey report to the State for approval. The survey must be conducted according to State guidelines and by persons approved by the State to conduct watershed surveys. The survey must encompass the area of the watershed that was identified in the State-approved watershed control plan as the area of influence and, at a minimum, assess the priority activities identified in the plan and identify any significant new sources of *Cryptosporidium*.

(iii) Submit to the State a request for review and re-approval of the watershed control program and for a continuation of the 0.5 log removal credit for a subsequent approval period. The request must be provided to the State at least six months before the current approval period expires or by a date previously determined by the State. The request must include a summary of activities and issues identified during the previous approval period and a revised plan that addresses activities for the next approval period, including any new actual or potential sources of *Cryptosporidium* contamination and details of any proposed or expected changes from the existing State-approved program. The plan must address goals, prioritize specific actions to reduce source water *Cryptosporidium*, explain how actions are expected to contribute to achieving goals, identify partners and their role(s), resource requirements and commitments, and the schedule for plan implementation.

(iv) The annual status reports, watershed control plan and annual watershed sanitary surveys must be made 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. If approved by the State, the system may withhold portions of the annual status report, watershed control plan, and watershed sanitary survey based on security considerations.

(5) Unfiltered systems may not claim credit for *Cryptosporidium* removal under this option.

(b) Alternative source. (1) If approved by the State, a system may be classified in a bin under § 141.709 based on monitoring that is conducted concurrently with source water monitoring under § 141.701 and reflects a different intake location (either in the same source or for an alternate source) or a different procedure for managing the timing or level of withdrawal from the source.

(2) Sampling and analysis of *Cryptosporidium* in the concurrent round of monitoring must conform to the requirements for monitoring conducted under this subpart to determine bin classification. Systems must submit the results of all monitoring to the State, along with supporting information documenting the operating conditions under which the samples were collected.

(3) If the State classifies the system in a bin based on monitoring that reflects 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 use

the intake management strategy, as applicable, no later than the applicable date for treatment technique implementation in § 141.701. The State may specify reporting requirements to verify operational practices.

§ 141.726 Pre-filtration treatment toolbox components.

(a) *Presedimentation.* New presedimentation basins that meet the criteria in paragraphs (a)(1) through (4) of this section are eligible for 0.5 log *Cryptosporidium* removal credit. Systems with presedimentation basins existing when the system is required to conduct monitoring under § 141.702(a) may not claim this credit and, during periods when the basins are in use, must collect samples after the basins for the purpose of determining bin classification under § 141.709.

(1) The presedimentation basin must be in continuous operation and must treat all of the flow reaching the treatment plant.

(2) The system must continuously add a coagulant to the presedimentation basin.

(3) Presedimentation basin influent and effluent turbidity must be measured at least once per day or more frequently as determined by the State.

(4) The system must demonstrate on a monthly basis at least 0.5 log reduction of influent turbidity through the presedimentation process in at least 11 of the 12 previous consecutive months.

(i) The monthly demonstration of turbidity reduction must be based on the mean of daily turbidity readings collected under paragraph (a)(3) of this section and calculated as follows: $\log_{10}$(monthly mean of daily influent turbidity)—$\log_{10}$(monthly mean of daily effluent turbidity).

(ii) If the presedimentation process has not been in operation for 12 months, the system must verify on a monthly basis at least 0.5 log reduction of influent turbidity through the presedimentation process, calculated as specified in this paragraph, for at least all but any one of the months of operation.

(b) *Two-stage lime softening.* Systems that operate a two-stage lime softening plant are eligible for an additional 0.5 log *Cryptosporidium* removal credit if there is a second clarification step between the primary clarifier and filter(s) that is operated continuously. Both clarifiers must treat all of the plant flow and a coagulant, which may be excess lime or magnesium hydroxide, must be present in both clarifiers.

(c) *Bank filtration.* New bank filtration that serves as pretreatment to a filtration plant is eligible for either a 0.5 or a 1.0 log *Cryptosporidium* removal credit towards the requirements of this subpart if it meets the design criteria specified in paragraphs (c)(1) through (c)(5) of this section and the monitoring and reporting criteria of paragraph (c)(6) of this section. Wells with a ground water flow path of at least 25 feet are eligible for 0.5 log removal credit; wells with a ground water flow path of at least 50 feet are eligible for 1.0 log removal credit. The ground water flow path must be determined as specified in paragraph (c)(5) of this section.

(1) Only horizontal and vertical wells are eligible for bank filtration removal credit.

(2) Only wells in granular aquifers are eligible for bank filtration removal credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles, and minor cement. The aquifer material must be unconsolidated as demonstrated by the aquifer characterization specified in paragraph (c)(3) of this section, unless the system meets the conditions of paragraph (c)(4) of this section. Wells located in consolidated aquifers, fractured bedrock, karst limestone, and gravel aquifers are not eligible for bank filtration removal credit.

(3) A system seeking removal credit for bank filtration must characterize the aquifer at the well site to determine aquifer properties. The aquifer characterization must include the collection of relatively undisturbed continuous core samples from the surface to a depth at least equal to the bottom of the well screen. The recovered core length must be at least 90 percent of the total projected depth to the well screen, and each sampled interval must be a composite of no more than 2 feet in length. A well is eligible for removal credit if at least 90 percent of the composited intervals from the aquifer contain at least 10 percent fine grained material, which is defined as grains less than 1.0 mm in diameter.

(4) Wells constructed in partially consolidated granular aquifers are eligible for removal credit if approved by the State based on a demonstraton by the system that the aquifer provides sufficient natural filtration. The demonstration must include a characterization of the extent of cementation and fractures present in the aquifer.

(5) For vertical wells, the ground water flow path is the measured horizontal distance from the edge of the surface water body to the well. This horzontal distance to the surface water must be determined using the floodway boundary or 100 year flood elevation boundary as delineated on Federal Emergency Management Agency (FEMA) Flood Insurance Rate maps. If the floodway boundary or 100 year flood elevation boundary is not delineated, systems must determine the floodway or 100 year flood elevation boundary using methods substantially equilvalent to those used in preparing FEMA Flood Insurance Rate maps. For horizontal wells, the ground water flow path is the closest measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral intake.

(6) Turbidity measurements must be performed on representative samples from each wellhead at least every four hours that the bank filtration is in operation. Continuous turbidity monitoring at each wellhead may be used if the system validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State. If the monthly average of daily maximum turbidity values at any well exceeds 1 NTU, the system must report this finding to the State within 30 days. In addition, within 30 days of the exceedance, the system must conduct an assessment to determine the cause of the high turbidity levels and submit that assessment to the State for a determination of whether any previously allowed credit is still appropriate.

(7) Systems with bank filtration that serves as pretreatment to a filtration plant and that exists when the system is required to conduct monitoring under § 141.702(a) may not claim this credit. During periods when the bank filtration is in use, systems must collect samples after the bank filtration for the purpose of determining bin classification under § 141.709.

§ 141.727 Treatment performance toolbox components.

(a) *Combined filter performance.* Systems using conventional filtration treatment or direct filtration treatment may claim an additional 0.5 log *Cryptosporidium* removal credit for any month at each plant that demonstrates that combined filter effluent (CFE) turbidity levels are less than or equal to 0.15 NTU in at least 95 percent of the measurements taken each month, based on sample measurements collected under § § 141.73,141.173(a) and 141.551. Systems may not claim credit under this paragraph and paragraph (b) in the same month.

(b) *Individual filter performance.* Systems using conventional filtration treatment or direct filtration treatment

may claim an additional 1.0 log *Cryptosporidium* removal credit for any month at each plant that meets both the individual filter effluent (IFE) turbidity requirements of paragraphs (b)(1) and (2) of this section, based on monitoring conducted under § § 141.174(a) and 141.560.

(1) IFE turbidity must be less than 0.1 NTU in at least 95% of the maximum daily values recorded at each filter in each month, excluding the 15 minute period following return to service from a filter backwash.

(2) No individual filter may have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.

(c)(1) *Demonstration of performance.* Systems may demonstrate to the State, through the use of State-approved protocols, that a plant, or unit process of a plant, achieves a mean *Cryptosporidium* removal efficiency greater than any presumptive credit specified under § 141.720 or § § 141.725 through 141.728. Systems are eligible for an increased *Cryptosporidium* removal credit if the State determines that the plant or process can reliably achieve such a removal efficiency on a continuing basis and the State provides written notification of its determination to the system. States may establish ongoing monitoring and/or performance requirements the State determines are necessary to demonstrate the greater credit and may require the system to report operational data on a monthly basis to verify that conditions under which the demonstration of performance was awarded are maintained during routine operations. If the State determines that a plant, or unit process of a plant, achieves an average *Cryptosporidium* removal efficiency less than any presumptive credit specified under § 141.720 or § § 141.725 through 141.728, the State may assign the lower credit to the plant or unit process.

(2) Systems may not claim presumptive credit for any toolbox box component in § § 141.726, 141.727(a) and (b), or 141.728 if that component is also included in the demonstration of performance credit.

§ 141.728 Additional filtration toolbox components.

(a) *Bag and cartridge filters.* Systems are eligible for a 1 log *Cryptosporidium* removal credit for bag filters and a 2 log *Cryptosporidium* removal credit for cartridge filters by meeting the criteria in paragraphs (a)(1) through (a)(10) of this section. The request to the State for this credit must include the results of challenge testing that meets the requirements of paragraphs (a)(2) through (a)(9) of this section.

(1) To receive a 1 log *Cryptosporidium* removal credit for a bag filter, the filter must demonstrate a removal efficiency of 2 log or greater for *Cryptosporidium*. To receive a 2 log *Cryptosporidium* removal credit for a cartridge filter, the filter must demonstrate a removal efficiency of 3 log or greater for *Cryptosporidium*. Removal efficiency must be demonstrated through challenge testing conducted according to the criteria in paragraphs (a)(2) through (a)(9) of this section. The State may accept data from challenge testing conducted prior to [Date of Publication of Final Rule in the **Federal Register**] in lieu of additional testing if the prior testing was consistent with the criteria specified in paragraphs (a)(2) through (a)(9) of this section.

(2) Challenge testing must be performed on full-scale bag or cartridge filters that are identical in material and construction to the filters proposed for use in full-scale treatment facilities for removal of *Cryptosporidium*.

(3) 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 must be determined using a method capable of discreetly quantifying the specific organism or surrogate used in the test; gross measurements such as turbidity may not be used.

(4) The maximum feed water concentration that can be used during a challenge test must be based on the detection limit of the challenge particulate in the filtrate (*i.e.*, filtrate detection limit) and must be calculated using the equation in either paragraph (a)(4)(i) or (a)(4)(ii) of this section as applicable.

(i) For cartridge filters: Maximum Feed Concentration = $3.16\times10^4 \times$ (Filtrate Detection Limit).

(ii) For bag filters: Maximum Feed Concentration = $3.16\times10^3 \times$ (Filtrate Detection Limit).

(5) Challenge testing must be conducted at the maximum design flow rate for the filter as specified by the manufacturer.

(6) Each filter evaluated must be tested for a duration sufficient to reach 100 percent of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with the requirements of this subpart.

(7) Each filter evaluated must be challenged with the challenge particulate during three periods over the filtration cycle: within two hours of start-up after a new bag or cartridge filter has been installed; when the pressure drop is between 45 and 55 percent of the terminal pressure drop; and at the end of the run after the pressure drop has reached 100 percent of the terminal pressure drop.

(8) Removal efficiency of a bag or cartridge 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 used during the challenge test; and C_p = the filtrate concentration observed 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. An LRV must be calculated for each filter evaluated during the testing.

(9) If fewer than 20 filters are tested, the removal efficiency for the filtration device must be set equal to the lowest of the representative LRVs among the filters tested. If 20 or more filters are tested, then removal efficiency of the filtration device must be set equal to the 10th percentile of the representative LRVs among 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 system may calculate the 10th percentile using linear interpolation.

(10) If a previously tested bag or cartidge filter is modified in a manner that could change the removal efficiency of the filter, addition challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted to the State.

(b) *Membrane filtration.* (1) Systems using a membrane filtration process, including a membrane cartridge filter that meets the definition of membrane filtration and the integrity testing requirements of this subpart, are eligible for a *Cryptosporidium* removal credit equal to the lower value of paragraph (b)(1)(i) or (b)(1) (ii) of this section:

(i) The removal efficiency demonstrated during challenge testing conducted under the conditions in paragraph (b)(2) of this section.

(ii) The maximum removal efficiency that can be verified through direct integrity testing used with the

membrane filtration process under the conditions in paragraph (b)(3) of this section.

(2) *Challenge Testing.* The membrane used by the system must undergo challenge testing to evaluate removal efficiency, and the system must submit the results of challenge testing to the State. Challenge testing must be conducted according to the criteria in paragraphs (b)(2)(i) through (b)(2)(vii) of this section. The State may accept data from challenge testing conducted prior to [Date of Publication of Final Rule in the **Federal Register**] in lieu of additional testing if the prior testing was consistent with the criteria in paragraphs (b)(2)(i) through (b)(2) (vii) of this section.

(i) Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module.

(ii) Challenge testing must be conducted using *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.

(iii) The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation:

$$\text{Maximum Feed Concentration} = 3.16\times10^{6} \times (\text{Filtrate Detection Limit})$$

(iv) Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacture for the membrane module. Flux is defined as the rate of flow per unit of membrane area. Recovery is defined as the ratio of filtrate volume produced by a membrane to feed water volume applied to a membrane over the course of an uninterrupted operating cycle. An operating cycle is bounded by two consecutive backwash or cleaning events. For the purpose of challenge testing in this section, recovery does not consider losses that occur due to the use of filtrate in backwashing or cleaning operations.

(v) Removal efficiency of a membrane module during challenge testing must be determined as a log removal 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 used during the challenge test; and C_p = the filtrate concentration observed 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. An LRV must be calculated for each membrane module evaluated during the test.

(vi) The removal efficiency of a membrane filtration process demonstrated during challenge testing must be expressed as a log removal value ($LRV_{C\text{-}Test}$). If fewer than 20 modules are tested, then $LRV_{C\text{-}Test}$ is equal to the lowest of the representative LRVs among the applicable 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 applicable modules tested. The percentile is defined by (i/(n+1)) where i is the rank of n individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(vii) The challenge test must establish a quality control release value (QCRV) for a non-destructive performance test that demonstrates the *Cryptosporidium* removal capability of the membrane filtration process. This performance test must be applied to each production membrane module used by the system that did not undergo a challenge test in order to verify *Cryptosporidium* removal capability. Production modules that do not meet the established QCRV are not eligible for the removal credit demonstrated during the challenge test.

(viii) If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the non-destructive performance test and associated QCRV, addition challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the State.

(3) *Direct integrity testing.* Systems must conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in paragraphs (b)(3)(i) through (b)(3)(vi) of this section.

(i) The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is 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 maintenance.

(ii) The direct integrity method must have a resolution of 3 μm or less, where resolution is defined as the smallest leak size that contributes to a response from the direct integrity test.

(iii) The system must demonstrate that the direct integrity test can verify the log removal credit awarded to the membrane filtration process by the State using the approach in either paragraph (b)(2)(iii)(A) or (b)(2)(iii)(B) of this section as applicable based on the type of direct integrity test.

(A) For direct integrity tests that use an applied pressure or vacuum, the maximum log removal value that can be verified by the test must be calculated according to the following equation:

$$LRV_{DIT} = LOG_{10}(Q_p / (VCF \times Q_{breach}))$$

where LRV_{DIT} = maximum log removal value that can be verified by a direct integrity test; Q_p = total design filtrate flow from the membrane unit; Q_{breach} = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured, and VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

(B) For direct integrity tests that use a particulate or molecular marker, the maximum log removal value that can be verified by the test must be calculated according to the following equation:

$$LRV_{DIT} = LOG_{10}(C_f) - LOG_{10}(C_p)$$

where LRV_{DIT} = maximum log removal value that can be verified by a direct integrity test; C_f = the typical feed concentration of the marker used in the test; and C_p = the filtrate concentration of the marker from an integral membrane unit.

(iv) Systems must establish a control limit for the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the State.

(v) If the result of a direct integrity test is outside the control limit established under paragraphs (b)(3)(i) through (b)(3)(iv) of this section, the membrane unit must be removed from service. A direct integrity test must be

conducted to verify any repairs, and the membrane unit may be returned to service only if the direct integrity test is within the established control limit.

(vi) Direct integrity testing must be conducted on each membrane unit at a frequency of not less than once each day that the membrane unit is in operation.

(4) *Indirect integrity monitoring.* Systems must conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in paragraphs (b)(4)(i) through (b)(4)(v) of this section. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in paragraphs (b)(3)(i) through (b)(3)(v) of this section is not subject to the requirements for continuous indirect integrity monitoring.

(i) Unless the State approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.

(ii) Continuous monitoring must be conducted at a frequency of no less than once every 15 minutes.

(iii) Continuous monitoring must be separately conducted on each membrane unit.

(iv) If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (*i.e.*, two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must be performed on the associated membrane units as specified in paragraphs (b)(3)(i) through (b)(3)(v) of this section.

(v) If indirect integrity monitoring includes a State-approved alternative parameter and if the alternative parameter exceeds a State-approved control limit for a period greater than 15 minutes, direct integrity testing must be performed on the associated membrane units as specified in paragraphs (b)(3)(i) through (b)(3)(v) of this section.

(c) *Second stage filtration.* Systems are eligible for an additional 0.5 log *Cryptosporidium* removal credit if they have a separate second stage filtration process consisting of rapid sand, dual media, GAC, or other fine grain media in a separate stage following rapid sand or dual media filtration. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat 100% of the flow. A cap, such as GAC, on a single stage of filtration is not eligible for this credit.

(d) *Slow sand filtration.* Systems may claim a 2.5 log *Cryptosporidium* removal credit for a slow sand filtration process that follows another separate filtration process if all the flow is treated by both processes and no disinfectant residual is present in the influent water to the slow sand filtration process.

§ 141.729 Inactivation toolbox components.

(a) *Calculation of CT values.* (1) CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in §§ 141.74(a) and 141.74(b).

(2) Systems with several disinfection segments (a segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume) in sequence along the treatment train, may calculate the CT for each disinfection segment and use the sum of the *Cryptosporidium* log inactivation values achieved through the plant.

(b) *CT values for chlorine dioxide.* (1) Systems using chlorine dioxide must calculate CT in accordance with § 141.729(a).

(2) Unless the State approves alternative CT values for a system under paragraph (b)(3) of this section, systems must use the following table to determine *Cryptosporidium* log inactivation credit:

CT VALUES FOR *Cryptosporidium* INACTIVATION BY CHLORINE DIOXIDE

Log credit	Water Temperature, °C [1]									
	<=0.5	1	2	3	5	7	10	15	20	25
0.5	319	305	279	256	214	180	138	89	58	38
1.0	637	610	558	511	429	360	277	179	116	75
1.5	956	915	838	767	643	539	415	268	174	113
2.0	1275	1220	1117	1023	858	719	553	357	232	150
2.5	1594	1525	1396	1278	1072	899	691	447	289	188
3.0	1912	1830	1675	1534	1286	1079	830	536	347	226

[1] CT values between the indicated temperatures may be determined by interpolation.

(3) Systems may conduct a site-specific inactivation study to determine the CT values necessary to meet a specified *Cryptosporidium* log inactivation level, using a State-approved protocol. The alternative CT values determined from the site-specific study and the method of calculation must be approved by the State.

(c) *CT values for ozone.* (1) Systems using ozone must calculate CT in accordance with § 141.729(a).

(2) Unless the State approves alternative CT values for a system under paragraph (c)(3) of this section, systems must use the following table to determine *Cryptosporidium* log inactivation credit:

CT VALUES FOR *Cryptosporidium* INACTIVATION BY OZONE

Log credit	Water Temperature, °C1 [1]									
	<=0.5	1	2	3	5	7	10	15	20	25
0.5	12	12	10	9.5	7.9	6.5	4.9	3.1	2.0	1.2
1.0	24	23	21	19	16	13	9.9	6.2	3.9	2.5
1.5	36	35	31	29	24	20	15	9.3	5.9	3.7
2.0	48	46	42	38	32	26	20	12	7.8	4.9
2.5	60	58	52	48	40	33	25	16	9.8	6.2

CT VALUES FOR *Cryptosporidium* INACTIVATION BY OZONE—Continued

Log credit	Water Temperature, °C1 [1]									
	<=0.5	1	2	3	5	7	10	15	20	25
3.0	72	69	63	57	47	39	30	19	12	7.4

[1] CT values between the indicated temperatures may be determined by interpolation

(3) Systems may conduct a site-specific inactivation study to determine the CT values necessary to meet a specified *Cryptosporidium* log inactivation level, using a State-approved protocol. The alternative CT values determined from the site-specific study and the method of calculation must be approved by the State.

(d) *Ultraviolet light.* (1) Systems may claim credit for ultraviolet (UV) processes for inactivation of *Cryptosporidium*, *Giardia lamblia*, and viruses. The allowable inactivation credit for each pathogen must be based on the UV dose delivered by the system's UV reactors in relation to the UV dose table in paragraph (d)(2) of this section.

(2) *UV dose table.* The log credits given in this UV dose table are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. Systems may apply this table to UV reactors with other lamp types through reactor validation testing (*i.e.*, performance demonstration) as described in paragraph (d)(3) of this section. The UV dose values in this table are applicable only to post-filter application of UV in systems that filter under subpart H of this part and to unfiltered systems meeting the filtration avoidance criteria in subparts H, P, and T of this part:

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])
0.5	1.6	1.5	39
1.0	2.5	2.1	58
1.5	3.9	3.0	79
2.0	5.8	5.2	100
2.5	8.5	7.7	121
3.0	12	11	143
3.5	NA	NA	163
4.0	NA	NA	186

(3) *Reactor validation testing.* For a system to receive inactivation credit for a UV reactor, the reactor must undergo the validation testing in paragraphs (d)(3)(i) and (d)(3)(ii) of this section, unless the State approves an alternative approach. The validation testing must demonstrate the operating conditions under which the reactor can deliver the UV dose required in paragraph (d)(2) of this section.

(i) Validation testing of UV reactors must determine a range of operating conditions that can be monitored by the system and under which the reactor delivers the required UV dose. At a minimum, these operating conditions must include flow rate, UV intensity as measured by a UV sensor, and UV lamp status. The validated operating conditions determined by this testing must account for the following: UV absorbance of the water; lamp fouling and aging; measurement uncertainty of on-line sensors; UV dose distributions arising from the velocity profiles through the reactor; failure of UV lamps or other critical system components; and inlet and outlet piping or channel configurations of the UV reactor.

(ii) Validation testing must include the following: full scale testing of a reactor that conforms uniformly to the UV reactors used by the system; and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

(4) *Reactor monitoring.* Systems must monitor their UV reactors to demonstrate that they are operating within the range of conditions that were validated by the testing described in paragraphs (d)(3)(i) and (d)(3)(ii) of this section to achieve the required UV dose in paragraph (d)(2) of this section. Systems must monitor for UV intensity as measured by a UV sensor, flow rate, and lamp outage and for any other parameters required by the State. Systems must verify the calibration of UV sensors and must recalibrate sensors in accordance with a protocol approved by the State.

Reporting and Recordkeeping Requirements

§ 141.730 Reporting requirements.

(a) Systems must follow the requirements for reporting sampling schedules under § 141.703 and for reporting source water monitoring results under § 141.707 unless they notify the State that they will not conduct source water monitoring due to meeting the criteria of § 141.701(f) or (g).

(b) Systems using uncovered finished water storage facilities must notify the State of the use of each facility no later than [Date 24 Months After Date of Publication of Final Rule in the **Federal Register**].

(c) Filtered systems and unfiltered systems that are required to install filtration must report their *Cryptosporidium* bin classification, as determined under using the procedures in § 141.709, to the State by the applicable dates in paragraph (c)(1) or (2) of this section.

(1) Systems that serve at least 10,000 people must report their initial bin classification no later than [Date 36 Months After Date of Publication of Final Rule in the **Federal Register**] and must report their bin classification determined using results from the second round of source water monitoring no later than [Date 138 Months After Date of Publication of Final Rule in the **Federal Register**].

(2) Systems that serve fewer than 10,000 people must report their initial bin classification no later than [Date 66 Months After Date of Publication of Final Rule in the **Federal Register**] and must report their bin classification determined using results from the second round of source water monitoring no later than [Date 174 Months After Date of Publication of Final Rule in the **Federal Register**].

(d) Unfiltered systems that meet all filtration avoidance criteria of § 141.71 must report their mean *Cryptosporidium* concentration, as determined under § 141.721, to the State by the applicable dates in paragraph (d)(1) or (2) of this section.

(1) Systems that serve at least 10,000 people must report their initial mean *Cryptosporidium* concentration no later than [Date 36 Months After Date of Publication of Final Rule in the **Federal Register**] and must report their mean *Cryptosporidium* concentration determined using results from the second round of source water monitoring no later than [Date 138 Months After Date of Publication of Final Rule in the **Federal Register**].

(2) Systems that serve fewer than 10,000 people must report their initial mean *Cryptosporidium* concentration no later than [Date 66 Months After Date of Publication of Final Rule in the **Federal Register**] and must report their mean *Cryptosporidium* concentration determined using results from the second round of source water monitoring no later than [Date 174 Months After Date of Publication of Final Rule in the **Federal Register**].

(e) Systems must report to the State in accordance with the following table in this paragraph for any toolbox options used to comply with the *Cryptosporidium* treatment technique requirements under § 141.720 or § 141.721. The State may place additional reporting requirements it determines to be necessary to verify operation in accordance with required criteria for all toolbox options:

MICROBIAL TOOLBOX REPORTING REQUIREMENTS

Toolbox option	Systems must submit the following information	On the following schedule[1]—systems serving ≥ 10,000 people	On the following schedule[1]—systems serving < 10,000 people
(1) Watershed control program (WCP).	(i) Notify State of intention to develop WCP.	No later than [Date 48 Months After Date of Publication of Final Rule in the **Federal Register**].	No later than [Date 78 Months After Date of Publication of Final Rule in the **Federal Register**].
	(ii) Submit initial WCP plan to State.	No later than [Date 60 Months After Date of Publication of Final Rule in the **Federal Register**].	No later than [Date 90 Months After Date of Publication of Final Rule in the **Federal Register**].
	(iii) Annual report and State-approved watershed survey report.	By a date determined by the State, every 12 months, beginning on [Date 84 Months After Date of Publication of Final Rule in the **Federal Register**].	By a date determined by the State, every 12 months, beginning on [Date 114 Months After Date of Publication of Final Rule in the **Federal Register**].
	(iv) Request for re-approval and report on the previous approval period.	Six months prior to the end of the current approval period or by a date previously determined by the State.	Six months prior to the end of the current approval period or by a date previously determined by the State.
(2) Bank filtration	(i) Initial demonstration of the following: unconsolidated, predominantly sandy aquifer and setback distance of at least 25 ft. (0.5 log credit) or 50 ft. (1.0 log credit).	Initial demonstration no later than [Date 72 Months after Date of Publication of Final Rule in the **Federal Register**].	Initial demonstration no later than [Date 102 Months after Date of Publication of Final Rule in the **Federal Register**].
	(ii) If monthly average of daily max turbidity is greater than 1 NTU then system must report result and submit an assessment of the cause.	Report within 30 days following the month in which the monitoring was conducted, beginning on [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Report within 30 days following the month in which the monitoring was conducted, beginning on [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(3) Presedimentation	Monthly verification of the following; Continuous basin operation; treatment of 100% of the flow; continuous addition of a coagulant; and at least 0.5 log removal of influent turbidity based on the monthly mean of daily turbidity readings for 11 of the 12 previous months.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(4) Two-sage lime softening	Monthly verification of the following: Continuous operation of a second clarification step between the primary clarifier and filter; continuous presence of a coagulant in both primary and secondary clarifiers; and both clarifiers treated 100% of the plant flow.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].

MICROBIAL TOOLBOX REPORTING REQUIREMENTS—Continued

Toolbox option	Systems must submit the following information	On the following schedule[1]—systems serving ≥ 10,000 people	On the following schedule[1]—systems serving < 10,000 people
(5) 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 [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(6) Individual filter performance	Monthly verification of the following: Individual filter effluent (IFE) turbidity levels less than or equal to 0.1 NTU in at least 95 percent of all daily maximum IFE measurements taken each month (excluding 15 min period following start-up after backwash); and 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 [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(7) Membrane filtration	(i) Results of verification testing demonstrating the following: Removal efficiency established through challenge testing that meets criteria in this subpart; and integrity testing and associated baseline.	No later than [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	No later than [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
	(ii) Monthly report summarizing all direct integrity tests above the control limit and, if applicable, any 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 [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Within 10 days following the month in which monitoring was conducted, beginning [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(8) Bag filters and cartridge filters	(i) Demonstration that the following criteria are met: process meets the definition of bag or cartridge filtration; removal efficiency established through challenge testing that meets criteria in this subpart; and challenge test shows at least 2 log removal for bag filters and 3 log removal for cartridge filters.	No later than [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	No later than [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
	(ii) Monthly verification that 100% of flow was filtered.	Within 10 days following the month in which monitoring was conducted, beginning [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Within 10 days following the month in which monitoring was conducted, beginning [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(9) Second stage filtration	Monthly verification that 100% of flow was filtered through both stages.	Within 10 days following the month in which monitoring was conducted, beginning [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Within 10 days following the month in which monitoring was conducted, beginning [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(10) Slow and filtration	Monthly verification that 100% of flow was filtered.	Within 10 days following the month in which monitoring was conducted, beginning [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Within 10 days following the month in which monitoring was conducted, beginning [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(11) Chlorine dioxide	Summary of CT values for each day based on Table in § 141.729(b).	Within 10 days following the month in which monitoring was conducted, beginning [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Within 10 days following the month in which monitoring was conducted, beginning [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].

MICROBIAL TOOLBOX REPORTING REQUIREMENTS—Continued

Toolbox option	Systems must submit the following information	On the following schedule[1]—systems serving ≥ 10,000 people	On the following schedule[1]—systems serving < 10,000 people
(12) Ozone	Summary of CT values for each day based on Table in § 141.729(c).	Within 10 days following the month in which monitoring was conducted, beginning [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Within 10 days following the month in which monitoring was conducted, beginning [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(13) UV	(i) Validation test results demonstrating operating conditions that achieve required UV dose.	No later than [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	No later than [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
	(ii) Monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose as specified in § 141.729(d).	Within 10 days following the month in which monitoring was conducted, beginning [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Within 10 days following the month in which monitoring was conducted, beginning [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
(14) Demonstration of performance	(i) Results from testing following a State approved protocol.	No later than [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	No later than [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].
	(ii) As required by the State, monthly verification of operation within conditions of State approval for demonstration of performance credit.	Within 10 days following the month in which monitoring was conducted, beginning [Date 72 Months After Date of Publication of Final Rule in the **Federal Register**].	Within 10 days following the month in which monitoring was conducted, beginning [Date 102 Months After Date of Publication of Final Rule in the **Federal Register**].

[1] States may allow up to an additional two years to the date when the first submittal must be completed for systems making capital improvements.

(f) Systems must report to the State the information associated with disinfection profiling and benchmarking requirements of §§ 141.711 to 141.714 in accordance with the tables in this paragraph.

TABLE 1.—DISINFECTION PROFILING REPORTING REQUIREMENTS FOR LARGE SYSTEMS

[Serving ≥10,000 people]

System type	Benchmark component	Submit the following items	On the following schedule
(1) Systems required to conduct *Cyrptosporidium* monitoring.	(i) Characterization of disinfection practices. See § 141.713.	*Giardia lamblia* and virus inactivation profiles must be on file for State review during sanitary survey.	No later than [Date 36 Months After Date of Publication of Final Rule in the **Federal Register**].
	(ii) State review of proposed significant changes to disinfection practice. See § 141.714.	Inactivation profile and benchmark determinations.	Prior to significant modification of disinfection practice.
(2) Systems not required to conduct *Cryptosporidium* monitoring[a].	(i) Applicability	None	None.
	(ii) Characterization of Disinfection Practices.	None	None.
	(iii) State Review of Proposed Changes to Disinfection Practices.	None	None.

[a] Systems that provide at least 5.5 log of *Cryptosporidium* treatment, consistent with a Bin 4 treatment requirement, are not required to conduct *Cryptosporidium* monitoring.

TABLE 2.—DISINFECTION PROFILING REPORTING REQUIREMENTS FOR SMALL SYSTEMS

[Serving < 10,000 people]

System type	Benchmark component	Submit the following items	On the following schedule
(1) Systems required to conduct *Cryptosporidium* monitoring.	(i) Characterization of disinfection practices. See § 141.713.	*Giardia lamblia* and virus disinfection profiles must be on file for State review during sanitary survey.	No later than [Date 66 Months After Date of Publication of Final Rule in the **Federal Register**].

TABLE 2.—DISINFECTION PROFILING REPORTING REQUIREMENTS FOR SMALL SYSTEMS—Continued

[Serving < 10,000 people]

System type	Benchmark component	Submit the following items	On the following schedule
	(ii) State review of proposed significant changes to disinfection practices. See § 141.714.	Disinfection profiles and benchmark determinations.	Prior to significant modification of disinfection practice.
(2) Systems not required to conduct *Cryptosporidium* monitoring and that exceed DBP triggers [a,b,c].	(i) Determination of requirement to profile. See § 141.711(b).	Report on TTHM and HAA5 LRAA values from monitoring under subpart L.	No later than [Date 42 Months After Date of Publication of Final Rule in the **Federal Register**].
	(ii) Characterization of disinfection practices. See § 141.713.	*Giardia lambia* and virus disinfection profiles must be on file for State review during sanitary survey.	No later than [Date 54 Months after Date of Publication of Final Rule in the **Federal Register**].
	(iii) State review of proposed significant changes to disinfection practices. See § 141.714.	Disinfection profiles and benchmark determinations.	Prior to significant modification of disinfection practice.
(3) Systems not required to conduct *Cryptosporidium* monitoring and that do not exceed DBP triggers [b,c].	(i) Determination of no requirement to profile. See § 141.711(b).	Report on TTHM and HAA5 LRAA values from monitoring under subpart L.	No later than [Date 42 Months After Date of Publication of Final Rule in the **Federal Register**].
	(ii) Characterization of disinfection practices. See § 141.713.	None	None.
	(iii) State review of proposed significant changes to disinfection practice. See § 141.714.	None	None.

[a] Systems that provide at least 5.5 log of *Cryptosporidium* treatment, consistent with a Bin 4 treatment requirement, are not required to conduct *Cryptosporidium* monitoring.
[b] See § 141.702(b) to determine if *Cryptosporidium* monitoring is required.
[c] See § 141.711(b) to determine if disinfection profiling is required based on TTHM or HAA5 LRAA.

§ 141.731 Recordkeeping requirements.

(a) Systems must keep results from monitoring required under § 141.702 until 36 months after all source water monitoring required under this section has been completed.

(b) Systems must keep a record of any notification to the State that they will not conduct source water monitoring due to meeting the criteria of § 141.701(f) or (g).

(c) Systems required to develop disinfection profiles under § 141.711 must keep disinfection profiles on file for State review during sanitary surveys.

PART 142—NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION

5. The authority citation for part 142 continues to read as follows:

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

6. Section 142.14 is amended by adding paragraphs (a)(8) and (a)(9) to read as follows:

§ 142.14 Records kept by States.

* * * * *

(a) * * *

(8) [Reserved]

(9) Any decisions made pursuant to the provisions of part 141, subpart W of this chapter.

(i) Results of source water *E. coli* and *Cryptosporidium* monitoring.

(ii) Initial bin classification for each system that currently provides filtration or that is unfiltered and required to install filtration, along with any change in bin classification due to watershed assessment during sanitary surveys or the second round of source water monitoring.

(iii) A determination of whether each system that is unfiltered and meets all the filtration avoidance criteria of § 141.71 of this chapter has a mean source water *Cryptosporidium* level above 0.01 oocysts/L, along with any changes in this determination due to the second round of source water monitoring.

(iv) The treatment or control measures that systems use to meet their *Cryptosporidium* treatment requirements under § 141.720 or § 141.721 of this section.

(v) A list of systems required to cover or treat the effluent of an uncovered finished water reservoir.

(vi) A list of systems for which the State has waived the requirement to cover or treat the effluent of uncovered finished water storage facilities and supporting documentation of the risk mitigation plan.

* * * * *

7. Section 142.15 is amended by adding paragraph (c)(6) to read as follows:

§ 142.15 Reports by States.

(c) * * *

(6) *Subpart W.* (i) The initial bin classification for each system that currently provides filtration or that is unfiltered and required to install filtration, along with any change in bin classification due to watershed assessment during sanitary surveys or the second round of source water monitoring.

(ii) A determination of whether each system that is unfiltered and meets all the filtration avoidance criteria of § 141.71 of this chapter has a mean source water *Cryptosporidium* level above 0.01 oocysts/L, along with any changes in this determination due to the second round of source water monitoring.

* * * * *

8. Section 142.16 is amended by adding paragraphs (m) and (n) to read as follows:

§ 142.16 Special primacy conditions.

* * * * *

(m) [Reserved]

(n) *Requirements for States to adopt 40 CFR part 141, subpart W.* In addition to the general primacy requirements elsewhere in this part, including the requirements that State regulations be at least as stringent as federal requirements, an application for approval of a State program revision that adopts 40 CFR part 141, subpart W,

must contain a description of how the State will accomplish the following program requirements where allowed in State programs.

(1) Assess significant changes in the watershed and source water as part of the sanitary survey process and determine appropriate follow-up action.

(2) Approve watershed control programs for the 0.5 log watershed control program credit in the microbial toolbox.

(3) Approval protocols for treatment credits under the Demonstration of Performance toolbox option and for alternative ozone and chlorine dioxide CT values.

(4) Determine that a system with an uncovered finished water reservoir has a risk mitigation plan that is adequate for purposes of waiving the requirement to cover or treat the reservoir.

[FR Doc. 03–18295 Filed 8–8–03; 8:45 am]

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Appendix C

Rule Fact Sheet/
Draft Quick Reference Guide

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Proposed Long Term 2 Enhanced Surface Water Treatment Rule

Summary
EPA is proposing the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) to reduce disease incidence associated with *Cryptosporidium* and other pathogenic microorganisms in drinking water. The LT2ESWTR will supplement existing regulations by targeting additional *Cryptosporidium* treatment requirements to higher risk systems. This regulation also contains provisions to mitigate risks from uncovered finished water storage facilities and to ensure that systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts (DBPs).

Background
Cryptosporidium is a protozoan parasite that is of particular concern in drinking water because it is resistant to disinfectants like chlorine and it has been associated with waterborne disease outbreaks. Ingestion of *Cryptosporidium* can cause acute gastrointestinal illness, and health effects in sensitive subpopulations (e.g., infants, AIDS patients, the elderly) may be severe, including the risk of death.

Existing drinking water regulations require public water systems (systems) that use surface water sources and provide filtration to achieve at least a 99 percent (2-log) removal of *Cryptosporidium*. New data on *Cryptosporidium* infectivity, occurrence, and treatment indicate that current treatment requirements are adequate for the majority of systems, but there is a subset of systems with higher vulnerability to *Cryptosporidium* where additional treatment is necessary. This vulnerable subset includes those filtered systems with the highest source water *Cryptosporidium* levels, along with unfiltered systems (systems that use surface water sources and do not provide filtration).

About this Regulation
The LT2ESWTR will protect public health by supplementing existing drinking water regulations with additional risk-targeted treatment requirements for *Cryptosporidium*. This regulation will apply to all systems that use surface water or ground water under the direct influence of surface water.

Cryptosporidium treatment: Under the LT2ESWTR, systems initially conduct source water monitoring for *Cryptosporidium* to determine their treatment requirements. Filtered systems will be classified in one of four risk bins based on their monitoring results. EPA projects that the majority of systems will be classified in the lowest risk bin, which carries no additional treatment requirements. Systems classified in higher risk bins must provide 90 to 99.7 percent (1.0 to 2.5-log) additional reduction of *Cryptosporidium* levels. The regulation specifies a range of treatment and management strategies, collectively termed the "microbial toolbox," that systems may select to meet their additional treatment requirements. All unfiltered systems must provide at least 99 or 99.9 percent (2 or 3-log) inactivation of *Cryptosporidium*, depending on the results of their monitoring.

Monitoring: *Cryptosporidium* monitoring by large systems (serving at least 10,000 people) will begin six months after the LT2ESWTR is finalized and will last for a duration of two years. Small systems (serving less than 10,000 people) are on a delayed schedule and will start monitoring when the required large system monitoring is finished. To reduce monitoring costs, small filtered systems will initially conduct one year of monitoring for *E. coli*, which is a bacterium that is less expensive to analyze than *Cryptosporidium*. These systems will be required to monitor for *Cryptosporidium* for

one year only if their *E. coli* results exceed specified triggering concentrations. Systems must conduct a second round of monitoring beginning six years after the initial bin classification. Systems may grandfather equivalent previously collected data in lieu of conducting new monitoring, and systems are not required to monitor if they provide the maximum level of treatment required under the rule.

***Other requirements*:** The LT2ESWTR proposal also contains disinfection profiling requirements to ensure that systems maintain protection against microbial pathogens as they take steps to reduce the formation of DBPs. These requirements are needed because EPA is concurrently developing a Stage 2 Disinfection Byproducts Rule that will establish more stringent standards for certain DBPs. Disinfection profiling involves systems assessing the level of disinfection they currently provide and then determining the impact that a proposed change in their disinfection practice would have on this level. Additionally, the proposed LT2ESWTR has requirements that address risk in uncovered finished water storage facilities, which are subject to contamination if not properly managed or treated.

The LT2ESWTR proposal reflects a consensus Agreement in Principle of the Stage 2 Microbial and Disinfection Byproducts Federal Advisory Committee.

Environmental and Public Health Benefits

The LT2ESWTR will improve the control of *Cryptosporidium* and other microbiological pathogens in drinking water systems with the highest risk levels. EPA estimates that full implementation of the LT2ESWTR will reduce the incidence of cryptosporidiosis - the gastrointestinal illness caused by ingestion of *Cryptosporidium* - by 256,000 to 1,019,000 cases per year, with an associated reduction of 37 to 141 premature deaths. The additional *Cryptosporidium* treatment requirements of the LT2ESWTR will also reduce exposure to other microbial pathogens, such as *Giardia*, that co-occur with *Cryptosporidium*. Additional protection from microbial pathogens will come from the provisions of this regulation that address disinfection profiling and uncovered finished water storage facilities, though these benefits have not been quantified.

Cost of the Regulation

The LT2ESWTR will result in increased costs to public water systems and States. The mean annualized present value costs of the LT2ESWTR are estimated to range from approximately $73.5 to $111 million (using a three percent discount rate). Public water systems will bear approximately 99 percent of this total cost ($72.5 to $110 million total annualized), with States incurring the remaining 1 percent ($0.9 to $1.0 million total annualized). The average annual household cost is estimated to be $1.07 to $1.68 per year, with 98 to 99 percent of households experiencing annual costs of less than $12 per year.

How to Get Additional Information

For general information on the LT2ESWTR, contact the Safe Drinking Water Hotline, at (800) 426-4791. For copies of the Federal Register notice of the proposed regulation or technical fact sheets, visit the EPA Safewater website, www.epa.gov/safewater/lt2/index.html. The Safe Drinking Water Hotline is open Monday through Friday, excluding legal holidays, from 9:00 a.m. to 5:30 p.m. Eastern Time.

Office of Water (4607M) EPA 815-F-03-005 July 2003 www.epa.gov/safewater

EPA United States Environmental Protection Agency

Proposed Long Tem 2 Enhanced Surface Water Treatment Rule: A Quick Reference Guide

Overview of the Rule

Title	Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) Proposed - 68 FR 47640, August 11, 2003, Vol. 68, No. 154
Purposes	Improve public health protection through the control of microbial contaminants by focusing on systems with elevated *Cryptosporidium* risk. Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR).
General Description	The LT2ESWTR builds upon the Surface Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule, and Long Term 1 Enhanced Surface Water Treatment Rule.
Utilities Covered	Public water systems that use surface water or ground water under the direct influence of surface water.

Public Health Benefits

Implementation of the LT2ESWTR will result in...	▸ Increased protection against gastrointestinal illness from microbiological pathogens, especially *Cryptosporidium*. ▸ Reduced likelihood of outbreaks of cryptosporidiosis. ▸ Reduced likelihood of endemic illness from *Cryptosporidium*.
Estimated impacts of the LT2ESWTR include...	▸ National total annualized cost: $73.5 - $110.5 million ▸ The average household will incur an increase between $1.07 and $1.68 per year.

Critical Deadlines and Requirements

For Drinking Water Systems

Rule + 6 Months	Systems serving ³ 10,000 people must begin 24 months of source water monitoring.*
Rule + 30 Months	Filtered systems serving < 10,000 people must begin 12 months of source water monitoring for *E. coli* or other state-approved indicator.*
Rule + 36 Months	All systems must comply with one of the treatment techniques for minimizing contamination at uncovered finished water storage facilities.
Rule + 48 Months	Unfiltered systems serving < 10,000 people, and filtered systems serving < 10,000 people that exceed *E. coli* trigger levels, must begin 12 months of source water monitoring for *Cryptosporidium*.*
Rule + 72 Months	Systems serving ³ 10,000 people must install and operate additional treatment in accordance with their bin classification.†
Rule + 102 Months	Systems serving < 10,000 people that were required to monitor their source water for *Cryptosporidium* must install and operate additional treatment in accordance with their bin classification.†
6 Years After Original Bin Classification	▸ Systems are required to conduct a second round of source water monitoring. ▸ Based on the results, systems must re-determine their bin classification and provide additional *Cryptosporidium* treatment, if necessary.

For States

Rule + 24 Months	States submit LT2ESWTR primacy revision applications to EPA (triggers interim primacy).
Rule + 48 Months	Primacy extension deadline–all states with a full 2-year extension must submit primacy revision applications to EPA.

* Systems must submit sampling schedules 3 months prior to when they are required to begin source water monitoring.

† States may allow up to an additional 24 months for compliance for systems making capital improvements.

Based on Proposed Rule

This quick reference guide is based on the proposed rule published in the *Federal Register* on August 11, 2003.

DRAFT

Major Provisions

Control of *Cryptosporidium*

Source Water Monitoring	Filtered and unfiltered systems serving ³ 10,000 people must conduct 24 months of source water monitoring for Cryptosporidium. Filtered systems must also record source water *E. coli* and turbidity levels. Filtered systems serving < 10,000 people must conduct 12 months of source water monitoring for *E. coli* .‡ If the *E. coli* trigger level is exceeded, the system must conduct an additional 12 months of source water monitoring for *Cryptosporidium.* Unfiltered systems serving < 10,000 people must conduct 12 months of source water monitoring for *Cryptosporidium.* Filtered systems providing 5.5 log of treatment for *Cryptosporidium* and unfiltered systems providing 3-log of treatment for *Cryptosporidium* are not required to conduct source water monitoring.
Installation of Additional Treatment	Filtered systems must provide additional treatment for *Cryptosporidium* based on their bin classification (average source water *Cryptosporidium* concentration), using treatment options from the "microbial toolbox". Unfiltered systems must provide additional treatment for *Cryptosporidium* using chlorine dioxide, ozone, or UV.
Uncovered Finished Water Storage Facility	Systems with an uncovered finished water storage facility must either: ‣ Cover the uncovered finished water storage facility; or, ‣ Treat the discharge to achieve > 4-log virus inactivation; or, ‣ Implement a state-approved risk mitigation plan.

Disinfection Profiling and Benchmarking

Community and nontransient noncommunity water systems required to conduct source water monitoring for *Cryptosporidium* must create disinfection profiles for *Giardia lamblia* and viruses.

- Systems serving < 10,000 people with levels of TTHM < 0.064 mg/L and HAA5 < 0.048 mg/L measured as a locational running annual average (LRAA) at all Stage 1 DBPR monitoring sites do not need to create disinfection profiles.
- Systems that prepare a disinfection profile must calculate a disinfection benchmark and consult with the state prior to making a significant change in disinfection practice.

‡ The state may approve an alternative indicator and set an appropriate trigger level for that indicator.

Bin Classification for Filtered Systems

Cryptosporidium Concentration (oocysts/L)	Bin Classification	Additional Cryptosporidium Treatment Required			Alternative Filtration**
		Conventional Filtration	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	
< 0.075	Bin 1††	None	None	None	None
0.075 to < 1.0	Bin 2	1 log	1.5 log	1 log	4 log
1.0 to < 3.0	Bin 3	2 log	2.5 log	2 log	5 log
> 3.0	Bin 4	2.5 log	3 log	2.5 log	5.5 log

** Treatment requirements in this column are TOTAL treatment requirements. The state will determine compliance with these treatment requirements.

†† Systems serving < 10,000 people that are not required to monitor for Cryptosporidium are placed in Bin 1.

For additional information on the LT2ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at www.epa.gov/safewater; or contact your State drinking water representative.

Additional material is available at www.epa.gov/safewater/lt2/index.html

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Appendix D

Draft Primacy Agency Data Entry Instructions, with Examples

draft

These data entry instructions do not substitute for EPA regulation nor is this document regulation itself. Thus, it cannot impose legally-binding requirements on EPA, states (primacy agencies), or the regulated community, and its examples may not apply to a particular situation based upon the particular circumstances. Examples provided in this draft document reflect provisions proposed on August 11, 2003 (68 *FR* 47640).

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Acronyms & Abbreviations

CFE:	Combined Filter Effluent
CFR	Code of Federal Regulations
CT	Contact Time
CT value	Contact Time required for inactivation of microbial pathogens
CWS	Community Water System
DBPs	Disinfection Byproducts
DTF	Data Transfer File
EPA	Environmental Protection Agency
GWUDI	Ground Water Under the Direct Influence of Surface Water
HAA5	Haloacetic Acids (Monochloroacetic, Dichloroacetic, Trichloroacetic, Monobromoacetic and Dibromoacetic Acids)
IESWTR	Interim Enhanced Surface Water Treatment Rule
IFE	Individual Filter Effluent
Log	Logarithm (common, base 10)
LIMS	Laboratory Information Management Systems
LRAA	Locational Running Annual Average
LT1ESWTR	Long Term 1 Enhanced Surface Water Treatment Rule
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
MCL	Maximum Contaminant Level
mg/L	Milligrams per Liter
MIF	Must Install Filtration
M&R	Monitoring and Reporting
NTU	Nephelolometric Turbidity Units
OGWDW	Office of Ground Water and Drinking Water
PN	Public Notification Rule
PWSs	Public Water Systems
PWSID	Public Water System Identifier
RTC	Return to Compliance
SAF	Successfully Avoiding Filtration
SDWA	Safe Drinking Water Act, or the ‘‘Act,’’ as amended in 1996
SDWIS	Safe Drinking Water Information System
SDWIS/FED	Safe Drinking Water Information System Federal (version 3.9)
Stage 1 DBPR	Stage 1 Disinfection and Disinfection Byproducts Rule
Stage 2 DBPR	Stage 2 Disinfectants and Disinfection Byproducts Rule
Subpart H system	PWS using surface water or ground water under the influence of surface water
SWTR	Surface Water Treatment Rule
TNCWS	Transient Noncommunity Water System
TT	Treatment Technique
TTHM	Total Trihalomethanes (Chloroform, Bromodichloromethane, Dibromochloromethane, and Bromoform)
UCMR	Unregulated Contaminants Monitoring Rule
UV	Ultraviolet light
x log removal	Reduction to $1/10^x$ of original concentration
XML	Extensible Markup Language

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Section 1

Introduction

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1.1 What Is the Purpose of This Document?

On August 11, 2003, the U.S. Environmental Protection Agency (EPA) proposed the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) in the *Federal Register* (68 *FR* 47640). This document is intended to provide guidance to primacy agencies regarding the monitoring and reporting (M&R) requirements of the LT2ESWTR. This document discusses, through the use of water system examples, the water system M&R requirements, compliance and recordkeeping calculations, systems' non-compliance information reporting responsibilities, and the primacy agency's reporting responsibilities to EPA's database, the Safe Drinking Water Information System Federal (SDWIS/FED). Using this reference, primacy agencies will be able to identify violations and report appropriate noncompliance information to EPA. Throughout this document, the term primacy agency will be used to refer to a state, tribal government, or EPA region with primary enforcement authority for the Safe Drinking Water Act (SDWA).

1.2 How Is This Document Organized?

The document includes this Introduction and three additional sections as follows: section 2 discusses violation determinations and when, where, and what to report; section 3 provides basic /FED reporting information regarding the LT2ESWTR; and section 4 describes additional sources of information regarding the LT2ESWTR. Section 2 is divided into subsections that discuss treatment technique (TT) violations, M&R violations, and recordkeeping violations. Each violation type uses example facility descriptions and the appropriate SDWIS/FED violation type codes to illustrate the typical violations that may be encountered during the routine operation of water systems. Sample extensible markup language (XML) and data transfer file (DTF) transactions that primacy agencies would report to EPA, representing the information for violations, are also included. NOTE: EPA's Office of Ground Water and Drinking Water (OGWDW) is currently defining its Safe Drinking Water Information System (SDWIS) Extensible Markup Language (XML) Schema. Once the Schema is available, this document will be updated to include XML transactions.

1.3 What Are the Benefits of the LT2ESWTR?

The LT2ESWTR is part of a series of rules that are intended to control microbial pathogens while minimizing the public health risks from disinfectants and disinfection byproducts (DBPs). The LT2ESWTR specifically addresses risks associated with reducing microbial pathogens in drinking water, including the protozoan *Cryptosporidium*. This rule was proposed concurrently with the Stage 2 Disinfection Byproducts Rule (Stage 2 DBPR) to balance risks posed by microbial pathogens with potential risks from cancer and reproductive and developmental health effects associated with DBPs in drinking water supplies.

For more information on the LT2ESWTR requirements please call the Safe Drinking Water Hotline (1-800-426-4791) or visit EPA's Web site at www.epa.gov/safewater/lt2.

1.4 What Is the General Applicability of the LT2ESWTR?

The LT2ESWTR applies to all water systems (including community water systems (CWSs), nontransient noncommunity water systems (NTNCWSs), and transient noncommunity water systems (TNCWSs)) that use surface water and ground water under the direct influence of surface water (GWUDI) as sources. The

rule will build on the Interim Enhanced Surface Water Treatment Rule (IESWTR) and the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) by improving control of microbial PWSs that use surface water or GWUDI as a source (also referred to as Subpart H systems) and serve 10,000 or more people, while the remaining systems continued to fall under the 1989 Surface Water Treatment Rule (SWTR). The 2001 LT1ESWTR extended the IESWTR requirements to Subpart H systems serving fewer than 10,000 people. The LT2ESWTR introduces source water monitoring requirements for *Cryptosporidium*, reduces some requirements for small systems, requires additional *Cryptosporidium* treatment for some filtered systems, and requires inactivation of *Cryptosporidium* by all unfiltered systems. The rule also includes provisions for disinfection profiling and benchmarking to ensure continued levels of microbial protection while public water systems (PWSs) take the necessary steps to comply with new DBP standards; covering, treating, or implementing a risk management plan for uncovered finished water reservoirs; and operating criteria for a number of treatment and management options (i.e., the microbial toolbox) that PWSs may implement to meet additional *Cryptosporidium* treatment requirements.

Under the LT2ESWTR, Subpart H systems serving fewer than 10,000 people will begin a two-phase monitoring strateg, with 1 year of biweekly sampling for *E. coli*, by **[insert date 30 months after rule promulgation]**. *Cryptosporidium* monitoring will be required only if *E. coli* trigger levels are exceeded. For systems serving 10,000 or more people, *Cryptosporidium* monitoring will begin **[insert date 6 months after rule promulgation]**. Systems will be allowed to use previously collected (i.e., grandfathered) *Cryptosporidium* monitoring data to meet LT2ESWTR monitoring requirements if the previously collected data are equivalent in sample number, frequency, and data quality to data that will be collected under the rule. Filtered systems that monitor for *Cryptosporidium* will use this data to classify themselves into one of four "bins" no later than **[insert date 36 months after rule promulgation]**. Following initial classification, systems will have 36 months to meet additional *Cryptosporidium* treatment requirements based on the system's bin classification. Primacy agencies can extend the deadline for installing additional treatment up to 2 years for systems making capital improvements. Compliance dates all stem from the *Cryptosporidium* monitoring and treatment compliance schedule.

1.5 What Is the SDWIS and How Does It Work?

SDWIS/FED is EPA's national database that stores routine information about the nation's drinking water. Primacy agencies implement and enforce SDWA by supervising the drinking water systems within their jurisdictions. SDWA requires that primacy agencies report drinking water information routinely to EPA; this information is maintained in SDWIS/FED.

Primacy agencies report the following information to EPA:

- Basic information on each water system, including: name, public water system identifier (PWSID) number, number of people served, type of system (year-round or seasonal), source of water (ground water or surface water), and a description of the treatment processes.

- Violation information for each water system: whether it has followed established M&R schedules, complied with mandated TTs, or cover or treat unfiltered finished water reservoir.

- Enforcement information: what actions primacy agencies have taken to ensure the drinking water systems return to compliance (RTC) if they are in violation of a drinking water regulation.

- Monitoring results for unregulated contaminants and for regulated contaminants in certain instances when the monitoring results exceed the maximum contaminant level (MCL).

EPA uses this information to determine if and when it needs to take action against non-compliant systems, oversee primacy agency drinking water programs, track contaminant levels, respond to public inquiries, and prepare national reports. EPA also uses this information to evaluate the effectiveness of its programs and regulations and to determine whether new regulations are needed to further protect public health.

1.6 How Is This Document Used?

This document evaluates compliance for each rule requirement (i.e., required system monitoring, system reporting to the primacy agency, system public notice, and reporting by the primacy agency to SDWIS/FED). The examples in this document include sample monitoring data and the calculations and data comparisons necessary to determine compliance with the requirements of the LT2ESWTR. Sample SDWIS/FED DTF tables show how the data describing violations of the LT2ESWTR are to be encoded to be entered into the SDWIS/FED system. In addition, the examples provide guidance regarding public notification requirements consistent with EPA's Public Notification (PN) Rule. This guidance document does not offer any examples of SDWIS/FED reporting requirements associated with water system violations of the PN Rule. Users should refer to the *Final State Implementation Guidance for the Public Notification Rule* (EPA 816-R-01-010, October 2001) for additional information on these requirements and reporting to primacy agencies and EPA.

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Section 2

Inventory, Violation Reporting, and Violation Reporting Fields

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Inventory and Violation Reporting

This section provides guidance on how primacy agencies need to report systems' sources of drinking water and violations of the LT2ESWTR to EPA. Inventory reporting is discussed in section 2.1 and followed by an overview of violations reporting in section 2.2. Sections 2.3 to 2.5 describe each type of violation: TT, M&R, and recordkeeping.

2.1 Inventory Reporting Requirements

Primacy agencies are required to identify and report all sources of drinking water to EPA using SDWIS/FED. Table 2-1 below identifies the types of sources and the code values for reporting sources of water. Further, for each source of water, an identification of the type of water the source provides is also required.

Table 2-1. SDWIS/FED Water Sources and Codes

Type Code (C0405)	Description	Permissible Water Type Codes (C0407)
IN	Intake	Surface Water (SW)
WL	Well	Ground Water (GW), GWUDI (GU)
RC	Roof Catchment	Ground Water (GW)
SP	Spring	Surface (SW), Ground Water (GW), or GWUDI (GU)
IG	Infiltration Gallery	GWUDI (GU) or Surface Water (SW)
RS	Reservoir	Surface Water (SW)
NP	Non-piped	Surface Water (SW), Ground Water (GW), or GWUDI (GU)
CC	Consecutive Connection	Surface Water (SW), Ground Water (GW), or GWUDI (GU)

All treatment that is applied to sources of drinking water must also be reported by primacy agencies. If a source of water is not treated, primacy agencies must affirm that as well. Primacy agencies can report a system's treatment through a treatment plant facility record and must include any linkage between the source of a water facility and treatment plant facility.

The following rules apply to source, treatment plant, and treatment reporting:

1. All treatment records will be posted to the SDWIS/FED database connected to treatment plant records, regardless of whether the treatment is occurring at a large treatment plant or a small building in which a disinfectant is added.

2. EPA has eliminated flexibility in reporting treatment data by eliminating the "generated treatment plants." Primacy agencies may only report the treatment for treatment plant records.

3. Primacy agencies must provide information to allow SDWIS/FED to link the source records to the treatment plant records.

4. For consecutive connections, EPA is aware of the complex relationships that may exist between buyers and sellers of drinking water. For purchasing water systems, EPA will only require reporting if the seller is treating the source other than by filtration or filtering the source or not providing any treatment. Sellers must report all treatment performed on their sources of water.

5. Explicit reporting of "no treatment" for a source is required.

The following discussion identifies the method to be used to meet the SDWIS/FED reporting requirement for the linkage between sources of water and treatment plants:

- Add a Source/Entity (SE) Flow Form (B3).
- Require the PWSID for Qualifier #1.
- Require stable and unchanging Source/Entity ID (i.e., WSF State Assigned ID) of the source of water for Qualifier #2, as well as for the treatment plant to which the source is flowing.
- Use the data element (A5000) for use in conjunction with Form B3.
- Link one source to one or more treatment plants.
- Prohibit linkage between a source and itself, or a treatment plant and itself.
- Prohibit linkage between two sources.
- Prohibit linkage between two treatment plants.
- Prohibit duplicate links between a specific source—treatment plant combination.
- Restrict links to sources of water and treatment plants of the same PWS (i.e., inter-PWS linkages will not be allowed).

In summary, the primacy agency must report all sources of water and all treatment, assign the treatment to a treatment plant record, and link the source records to the treatment plant records. With regard to SWTR reporting, they must also inform EPA of decisions made on unfiltered sources of water.

The example system below consists of four sources and two treatment plants. What follows is an example of the system information provided, data elements needed, and the DTF transactions that need to be created and reported to represent sources, treatment plants, treatment, and linkages in the example

water system. The water system is responsible for reporting the data to the primacy agency, which in turn reports to SDWIS/FED.

SDWIS/FED uses Form ID's B1, B2, and B3 for inventory reporting. Please see section 3 for a description of Form ID's used in SDWIS/FED reporting under the LT2ESWTR. See the *SDWIS/FED Data Entry Instructions* (EPA 68-W-99-002, April 2003) for definitions and explanations of Form ID's.

Example #1: Reporting Water System Inventory PWSID: AZ1234567

The Well #1, SE ID: 00001, and Well #2, SE ID: 00002, are permanent ground water and GWUDI sources, respectively, that are treated at Treatment Plant #1, SE ID: 00005. The C River source, SE ID: 00004, is a permanent surface water source treated at Treatment Plant #2, SE ID: 00006. In addition, the example water system purchases water from the Apple Water System, SE ID: 00003. The Apple Water System is a permanent surface water source and is filtered by the seller prior to delivery to the example water system. Water purchased from the Apple Water System is sent directly to the example system's distribution system with no further treatment. The treatment provided at Treatment Plant #1 is slow sand filtration. The treatment processes at Treatment Plant #2 include oxidation, coagulation, rapid mix, flocculation, sedimentation, rapid sand filtration, and chlorination. Tables 2-2 to 2-8 illustrate the data elements needed and the DTF transactions that need to be entered into SDWIS/FED.

Table 2-2. System Information, Data Elements, and DTFs for Source 00001

System Information:

SE ID:	00001 *(Qualifier 2)*
SE Name:	Well #1
SE Record Type:	Well
SE Code:	Groundwater

Data Elements:

Number	Name	Value or *Comment*
C0101	PWSID	AZ1234567 (*Qualifier 1*)
C0403	Name	Well #1
C0405	Type Code	WL *(Well Source)*
C0407	Water Type	GW *(Ground Water)*
C0409	Availability	P *(Permanent)*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
B1	AZ1234567	00001		I	C0403	WELL #1		
B1	AZ1234567	00001		I	C0405	WL		
B1	AZ1234567	00001		I	C0407	GW		
B1	AZ1234567	00001		I	C0409	P		

Table 2-3. System Information, Data Elements and DTFs for Source 00002

System Information:

SE ID: 00002 *(Qualifier 2)*
SE Name: Well #2
SE Record Type: Well
SE Code: GWUDI
SE Availability: Permanent

Data Elements:

Number	Name	Value or *Comment*
C0101	PWSID	AZ1234567 (*Qualifier 1*)
C0403	Name	Well #2
C0405	Type Code	WL *(Well Source)*
C0407	Water Type	GU *(GWUDI)*
C0409	Availability	P *(Permanent)*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
B1	AZ1234567	00002		I	C0403	WELL #2		
B1	AZ1234567	00002		I	C0405	WL		
B1	AZ1234567	00002		I	C0407	GU		
B1	AZ1234567	00002		I	C0409	P		

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Table 2-4. System Information, Data Elements, and DTFs for Source 00003

System Information:

SE ID:	00003 *(Qualifier 2)*
SE Name:	Apple Water System (AZ7654321)
SE Record Type:	Consecutive Connection
SE Code:	Surface
SE Availability:	Permanent
Buyer Treatment:	Not Treated
Seller Treatment:	Filtered

Data Elements:

Number	Name	Value or *Comment*
C0101	PWSID	AZ1234567 (*Qualifier 1*)
C0403	Name	Apple Water
C0405	Type Code	CC *(Consecutive Connection)*
C0407	Water Type	*SW (Surface Water)*
C0409	Availability	P *(Permanent)*
C0411	Seller ID	AZ7654321
C0433	Buyer Treatment	N *(Not Treated)*
C0435	Seller Treatment	F *(Filtered)*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
B1	AZ1234567	00003		I	C0403	APPLE WATER		
B1	AZ1234567	00003		I	C0405	CC		
B1	AZ1234567	00003		I	C0407	SW		
B1	AZ1234567	00003		I	C0409	P		
B1	AZ1234567	00003		I	C0411	AZ7654321		
B1	AZ1234567	00003		I	C0433	N		
B1	AZ1234567	00003		I	0435	F		

Table 2-5. System Information, Data Elements, and DTFs for Source 00004

System Information:

SE ID:	00004 *(Qualifier 2)*
SE Name:	C River
SE Record Type:	Intake
SE Code:	Surface
SE Availability:	Permanent

Data Elements:

Number	Name	Value or *Comment*
C0101	PWSID	AZ1234567 *(Qualifier 1)*
C0403	Name	C River
C0405	Type Code	IN *(Surface Water Intake)*
C0407	Water Type	SW *(Surface Water)*
C0409	Availability	P *(Permanent)*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
B1	AZ1234567	00004		I	C0403	C RIVER		
B1	AZ1234567	00004		I	C0405	IN		
B1	AZ1234567	00004		I	C0407	SW		
B1	AZ1234567	00004		I	C0409	P		

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Table 2-6. System Information, Data Elements and DTFs for Treatment Plant #1

System Information:

SE ID: 00005 *(Qualifier 2)*
SE Name: Treatment Plant #1
SE Record Type: Treatment Plant
Treatment ID: 00001 *(Qualifier 3)*
Treatment Process: Slow Sand Filtration

Data Elements:

Number	Name	Value or *Comment*
C0403	Name	Treatment Plant #1
C0405	Type Code	TP *(Treatment Plant)*
C0483	Treatment Objective	P *(Particulate Removal)*
C0485	Treatment Process	346 *(Slow Sand Filtration)*

Treatment ID 00001 is entered in Qualifier #3

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
B1	AZ1234567	00005		I	C0403	TREATMENT PLANT #1		
B1	AZ1234567	00005		I	C0405	TP		
B2	AZ1234567	00005	00001	I	C0483	P		
B2	AZ1234567	00005	00001	I	C0485	346		

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Table 2-7a. System Information, Data Elements for Treatment Plant #2

System Information:

SE ID:	00006 *(Qualifier 2)*
SE Name:	Treatment Plant #2
SE Record Type:	Treatment Plant
Treatment ID:	00001 *(Qualifier 3)*
Treatment Process:	Oxidation
Treatment ID:	00002 *(Qualifier 3)*
Treatment Process:	Coagulation
Treatment ID:	00003 (*Qualifier* 3)
Treatment Process:	Rapid Mix
Treatment ID:	00004 (*Qualifier* 3)
Treatment Process:	Flocculation
Treatment ID:	00005 (*Qualifier* 3)
Treatment Process:	Sedimentation
Treatment ID:	00006 (*Qualifier* 3)
Treatment Process:	Filtration, Rapid Sand
Treatment ID:	00007 *(Qualifier 3)*
Treatment Process:	Chlorine

Data Elements:

Number	Name	Value or *Comment*
C0403	Name	Treatment Plant #2
C0405	Type Code	TP *(Treatment Plant)*
C0483	Type Code	O *(Organics Removal)*
C0485	Type Code	543 *(Ozonation, Pre)*
C0483	Type Code	P *(Particulate Removal)*
C0485	Type Code	240 *(Coagulation)*
C0483	Type Code	P *(Particulate Removal)*
C0485	Type Code	600 *(Rapid Mix)*
C0483	Type Code	P *(Particulate Removal)*
C0485	Type Code	360 *(Flocculation)*
C0483	Type Code	P *(Particulate Removal)*
C0485	Type Code	660 *(Sedimentation)*
C0483	Type Code	P *(Particulate Removal)*

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Table 2-7b. DTFs for Treatment Plant #2

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
B1	AZ1234567	00006		I		TREATMENT PLANT #2		
B1	AZ1234567	00006		I		TP		
B2	AZ1234567	00006	00001	I	C0483	O		
B2	AZ1234567	00006	00001	I	C0485	543		
B2	AZ1234567	00006	00002	I	C0483	P		
B2	AZ1234567	00006	00002	I	C0485	240		
B2	AZ1234567	00006	00003	I	C0483	P		
B2	AZ1234567	00006	00003	I	C0485	600		
B2	AZ1234567	00006	00004	I	C0483	P		
B2	AZ1234567	00006	00004	I	C0485	360		
B2	AZ1234567	00006	00005	I	C0483	P		
B2	AZ1234567	00006	00005	I	C0485	660		
B2	AZ1234567	00006	00006	I	C0483	P		
B2	AZ1234567	00006	00006	I	C0485	345		
B2	AZ1234567	00006	00007	I	C0483	D		
B2	AZ1234567	00006	00007	I	C0485	401		

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Table 2-8. Data Elements and DTFs for Linkage Between Source Entity ID and Treatment ID

Data Elements:

Number	Name	Value or *Comment*
A5000	Facility Flow	Linkage between source entity ID and Treatment ID
C0101	PWSID	AZ1234567 *(Qualifier 1)*

SE ID in Qualifier #2 (12-18) (WSF State assigned ID of the source of water)
Treatment ID in Data Value 32-71

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
B3	AZ1234567	00001		I	A5000	00005		
B3	AZ1234567	00002		I	A5000	00005		
B3	AZ1234567	00004		I	A5000	00006		

Under the existing SWTR, primacy agencies must report certain treatment decisions for water systems subject to the rule. Specifically, where the primacy agency decides that an unfiltered source successfully meets filtration avoidance criteria, then that "successfully avoiding filtration" (SAF) status must be reported to EPA. If an unfiltered source fails to meet the filtration avoidance criteria, then the "must install filtration" (MIF) decision must be reported to EPA. These requirements continue to be in effect in the LT2ESWTR.

When either of these conditions exist, the primacy agency must report "SAF" or "MIF" in data element C0408. (In the past, these were reported as treatment codes.) Example #2 and Example #3 show the DTF transactions for reporting "SAF" and "MIF" status for drinking water systems. For existing sources of water (i.e., those that already exist in SDWIS/FED for primacy agencies performing traditional processing), the primacy agency must submit a "modify" transaction to change the value of this field. For sources to be newly inserted into SDWIS/FED, or for a primacy agency performing total replace processing (i.e., replacement of all data for a specified domain), the field should be inserted along with the remainder of the source data.

Example #2: Successfully Avoiding Filtration

System AA, which serves 400 people, has one treatment plant. Treatment Plant A1, SE ID: 00002 draws water from a high quality surface water source, D Lake, SE ID: 00001. The treatment provided at Treatment Plant A1 is chlorination and ozonation. Since Treatment Plant A1 went on-line, water quality records show that the total coliform concentration has been less than 100 per 100 mL in at least 90 percent of the measurements taken over the 6 months prior to the point of disinfectant application. The fecal coliform concentration is not measured. The source water turbidity, which is measured immediately prior to the point of disinfectant application, has not exceeded 5 nephelolometric turbidity units (NTU) since Treatment Plant A1 went on-line. Based on these measurements, System AA continues to meet the filtration avoidance criteria and is not required to install filtration. The data elements and DTF transactions that would be needed for the initial reporting of this source to SDWIS are shown in Table 2-9.

Table 2-9. System Information, Data Elements and DTF's for a System that is Successfully Avoiding Filtration

System Information:

SE ID:	00001 (*Qualifier 2*)
SE ID Name:	D Lake
SE Record Type:	IN
SE Code:	SW
SE Availability	Permanent

Data Elements:

Number	Name	Value or *Comment*
C0101	PWSID	GA1234568 (*Qualifier 1*)
C0403	Name	D Lake
C0405	Type Code	IN (*Surface Water Intake*)
C0407	Water Type	SW (*Surface Water*)
C0408		SAF (*Successfully Avoiding Filtration*)

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
B1	GA1234568	00001		I	C0405	IN		
B1	GA1234568	00001		I	C0407	SW		
B3	GA1234568	00001		I	C0408	SAF		

Example #3: Must Install Filtration (Modifying Existing Data)

System AB, which serves 1,000 people, has one treatment plant. Treatment Plant AB1, SE ID: 00003 draws water from Well E, SE ID: 00001. Well E is classified as a GWUDI. The only treatment provided at Treatment Plant AB1 is chlorination. Water quality records show that in the first 8 years of operation, the total coliform concentration met the requirement of less than 100 cfu per 100 mL in at least 90 percent

of the measurements taken over 6 months immediately prior to the point of disinfectant application. The fecal coliform concentration is not measured. The source water turbidity, which is measured immediately prior to the point of disinfectant application, did not exceed 5 NTU in the first 8 years that Treatment Plant AB1 was in operation. However, the treatment plant operators have noticed that in the last 12 months the water quality of the well source has begun to deteriorate. From January 1, 200X through June 30, 200X, the total coliform concentration exceeded 100 cfu per 100 mL in 15 percent of the measurements taken during those 6 months. Therefore, System AB no longer qualifies for filtration avoidance and is now required to install filtration by December 29, 200X+1. The data elements and DTF transactions that would be reported to SDWIS for failure to meet the filtration avoidance criteria are shown in Table 2-10 below. In this case, "M" is used since the data are being modified, as opposed to using "I" for inserting new data. Since the source of water had already been reported to SDWIS/FED, the primacy agency need only change the value of the field C0408 to MIF.

Table 2-10. System Information, Data Elements and DTF's for a System that Must Install Filtration

System ID: 00001 (*Qualifier 2*)
SE Name: Well E
SE Record Type: Well
SE Code: GWUDI
SE Availability Permanent

Data Elements:

Number	Name	Value or *Comment*
C0101	PWSID	GA1234569 (*Qualifier 1*)
C0408		MIF (*Must Install Filtration*)

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
B1	GA1234569	00001		M	C0408	MIF		

2.2 Violations Reporting

Violations of the LT2ESWTR include TT violations, M&R violations, and recordkeeping violations. The rule requires source water sample collection, analysis, reporting, and recordkeeping that will be used to classify systems into one of four "bins" for the purpose of requiring additional treatment for *Cryptosporidium*. Once classified into a bin, a system must comply with the additional TT requirements for that bin. Systems must also comply with other TT requirements regarding uncovered finished water reservoirs and significant changes in disinfection practice. The violations are summarized in Table 2-11a, "Summary of LT2ESWTR Violations." Table 2-11b, "Reporting Fields for LT2ESWTR," provides guidance about the violation fields that need to be reported by primacy agencies for each violation. Note that the violations codes included in this draft document are currently being reviewed and are subject to change. Criteria to distinguish between major and minor violations are also being developed. Additional detailed transaction coding instructions are contained in the *SDWIS/FED Data Entry Instructions* (April 2003).

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Table 2-11a. Summary of LT2ESWTR Violations[1]

VIOLATION DEFINITION	DESCRIPTION	MAJOR MINOR[2]	VIOLATION TYPE[3]	DETAILS
Type 07/LT2E Failure to meet one of the criteria in proposed §141.724(a)(1)-(3) regarding uncovered finished water reservoirs	Begins: 36 months after the promulgation of the LT2ESWTR Ends: When system meets one of the criteria in proposed §141.724(a)	N/A	TT	All Subpart H systems with uncovered finished water reservoirs. Compliance 36 months after promulgation. Risk mitigation plan must be submitted to state no later than 24 months after promulgation. Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.
Type 07/LT2E Making a significant change in disinfection practice without state approval	Begins: Day on which significant change is made or the state learns about the construction Ends: When state notifies the system that it approves of the treatment	N/A	TT	All Subpart H systems required to prepare a disinfection profile under proposed §141.711 that seek to make a significant change to their disinfection practice. Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.
Type 07/LT2E Failure to provide the level of treatment appropriate for the system's bin classification and existing treatment	Begins: According to compliance schedule in proposed §141.701(e) for initial round of source water monitoring and in proposed §141.XXX for the second round of source water monitoring Ends: When system installs and operates appropriate treatment	N/A	TT	All Subpart H systems that have a bin classification of 2, 3, or 4, or that have not determined their bin classification and do not have at least 5.5 log of *Cryptosporidium* treatment in place. Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.

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VIOLATION DEFINITION	DESCRIPTION	MAJOR MINOR[2]	VIOLATION TYPE[3]	DETAILS
Type 07/LT2E Failure of unfiltered system to provide treatment in accordance with proposed §141.721	Begins: According to compliance schedule in proposed §141.701(e) for initial round of source water monitoring and in proposed §141.XXX for the second round of source water monitoring Ends: When system installs and operates appropriate treatment	N/A	TT	All Subpart H systems that do not filter and meet the criteria for avoidance of filtration under 40 CFR 141.71. Systems must be in compliance with *Cryptosporidium* inactivation requirements presented in proposed §141.721. Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.
Type 03/LT2E Failure to conduct source water testing (either initial or second round) and characterize source water as specified in the relevant portion of proposed §141.701(a)-(f) and proposed §141.702(a)-(d)	Begins: According to compliance schedules in proposed §141.701(e) and §141.702(d) Ends: When system completes source water monitoring	xxx	M&R	All Subpart H systems that do not provide a total of 5.5 log treatment for *Cryptosporidium* before the date they are required to begin source water monitoring. Unfiltered systems that do not meet all the filtration avoidance criteria of 40 CFR 141.71 or that do not provide a total of at least 3 log *Cryptosporidium* inactivation. Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.
Type 03/LT2E Failure to submit a sampling schedule that specifies the calendar dates that all samples (initial and second round) required under proposed §141.701-702 will be taken	Begins: 3 months before system is required to begin source water monitoring (initial or second round) Ends: When system submits a sampling schedule	xxx	M&R	All Subpart H systems required to conduct source water monitoring. Compliance schedule provided in proposed §141.703(a)(1)-(4). Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.

VIOLATION DEFINITION	DESCRIPTION	MAJOR MINOR[2]	VIOLATION TYPE[3]	DETAILS
Type 03/LT2E Failure to collect a sample within 2 days of the date indicated in sampling schedule	Begins: day on which the system was scheduled to be collected Ends: Last day of month in which sample should have been collected	**xxx**	M&R	All Subpart H systems required to conduct source water monitoring. Violation occurs for failure to collect sample on required day without justification and to collect and analyze a sample on an alternative date as close to original date as feasible; or without justification for failure to report analytical results of *Cryptosporidium* sample because of laboratory error and to collect and analyze a replacement sample within 14 days of receiving notification that lab had erred.
Type 03/LT2E Failure to sample at required location	Violations reported based on system's sampling schedule	**xxx**	M&R	All Subpart H systems required to conduct source water monitoring.
Type 03/LT2E Failure to use required methods to analyze source water samples	Violations reported based on system's sampling schedule	**xxx**	M&R	All Subpart H systems required to conduct source water monitoring.
Type 03/LT2E Failure to use approved laboratory to analyze source water samples	Violations reported based on system's sampling schedule	**xxx**	M&R	All Subpart H systems required to conduct source water monitoring.
Type 03/LT2E Failure to report source water monitoring information as required by proposed §141.707	Begins: 10 days after the end of the first month following the month the sample was taken Ends: When results are submitted to EPA/state	**xxx**	M&R	All Subpart H systems required to conduct source water monitoring. Reporting dates are presented in proposed §141.701(e).

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VIOLATION DEFINITION	DESCRIPTION	MAJOR MINOR[2]	VIOLATION TYPE[3]	DETAILS
Type 03/LT2E Failure to properly calculate and specify *Cryptosporidium* bin classification (initial and second round)	Begins: According to compliance schedule in proposed §141.730(c) for the initial and second round of source water monitoring Ends: When system has classified itself into appropriate bin	xxx	M&R	All Subpart H systems required to conduct source water monitoring. For compliance, LT2ESWTR says simply "following completion" of source water monitoring. However, appropriate bin classification following initial source water monitoring must necessarily occur before the proposed §141.730(c) deadlines to report bin classification to the state. Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.
Type 03/LT2E Failure to develop *Giardia* and virus disinfection profiles in accordance with requirements of proposed §141.713	Begins: According to compliance schedule in proposed §141.712(a) Ends: When system has developed the required profiles	xxx	M&R	All Subpart H systems that do not have at least 5.5 log of *Cryptosporidium* treatment in place by the applicable date in proposed §141.701(e), or small systems that have to monitor for *Cryptosporidium* and have a total trihalomethanes (TTHM) locational running annual average (LRAA) of ≥0.064 (milligrams per Liter (mg/L), or haloacetic acids (HAA5) LRAA of ≥0.048 mg/L. Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.
Type 03/LT2E Failure to provide information regarding proper installation and operation of toolbox components (as specified in proposed §141.725–141.729)	Begins: According to compliance schedule in proposed §141.730(e) Ends: When system reports the necessary information/makes proper demonstration	xxx	M&R	All Subpart H systems required to provide additional treatment under proposed §141.720. Schedules appear in proposed §141.730. Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.

VIOLATION DEFINITION	DESCRIPTION	MAJOR MINOR[2]	VIOLATION TYPE[3]	DETAILS
Type 03/LT2E Failure to submit reports necessary to determine if system is or is not required to develop disinfection profile	Begins: 42 months after promulgation of the LT2ESWTR Ends: When system submits the information or begins disinfection profiling	**xxx**	M&R	All Subpart H systems serving <10,000 people that are not required to monitor for *Cryptosporidium*. Report is due 42 months after promulgation. Have future end date (such as 12/31/2050) with the end date modified as a result of a link to an RTC, to be reported.
Type 09/LT2E Failure to maintain *Giardia* and virus disinfection profiles on file for state review during sanitary surveys	Begins: When system discards profile or state becomes aware the profiles have been discarded End: When system retains the profiles	N/A	Recordkeeping	All Subpart H systems required to conduct *Cryptosporidium* monitoring under proposed §141.731(c).
Type 09/LT2E Failure to keep monitoring and bin characterization results for 36 months after the completion of source water monitoring.	Begins: When system discards information or state becomes aware the information has been discarded Ends: 36 months after source water monitoring is completed	N/A	Recordkeeping	All Subpart H systems required to conduct source water monitoring under proposed §141.731(a).

[1]This chart contains federally reportable violations for the LT2ESWTR. In the interest of reducing the reporting burden on states, EPA has limited the number and type of violations to be reported to SDWIS/FED. However, PWSs must keep records and report all required information to the state. Any violation of the rule is a basis for state or federal enforcement action.
[2]This column identifies the violation as being "major" or "minor" based on noncompliance circumstances.
[3]This column identifies the type of violation: M&R – monitoring and reporting; TT – treatment technique and Recordkeeping.

Violation Reporting Fields

Only the fields identified below in Table 2-11b, "Reporting Fields for LT2ESWTR Violations," are to be reported to represent LT2ESWTR violations. DTF capabilities such as qualifiers 1 and 2 (PWSID and Violation ID, respectively) continue to be required. Batch Sequence number continues to be optional. All other violation fields should NOT be included in submissions to EPA. Those fields, if included in a submission, will be rejected. As noted earlier, the violations codes included in this draft document are currently being reviewed and are subject to change.

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Table 2-11b. Reporting Fields for LT2ESWTR Violations

Violation	Type	Contaminant Code (C1103)	Type Code (C1105)	Compliance Period Begin Date (C1107)	Compliance Period End Date (C1109)	Major Violation Indicator (C1131)
Failure to take necessary action regarding uncovered finished water reservoir	TT	LT2E	07	36 months after the promulgation of the LT2ESWTR	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the state is satisfied that the system meets one of the criteria in proposed §141.724(a).	Do not report
Making a significant change in disinfection practice without state approval	TT	LT2E	07	Day on which significant change is made or the state learns about the change in disinfection	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the system receives approval from the state.	Do not report

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Violation	Type	Contaminant Code (C1103)	Type Code (C1105)	Compliance Period Begin Date (C1107)	Compliance Period End Date (C1109)	Major Violation Indicator (C1131)
Failure to provide the level of treatment appropriate for the system's bin classification (initial and second round)	TT	LT2E	07	**Initial round:** 72 months after the LT2ESWTR is promulgated for systems serving ≥10,000 people; 102 months after the LT2ESWTR is promulgated for systems serving <10,000 people that are required to conduct source water monitoring **Second round:** XX months after the LT2ESWTR is promulgated for systems serving ≥10,000 people; XX months after the LT2ESWTR is promulgated for systems serving <10,000 people that are required to conduct source water monitoring	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the state is satisfied that the system has installed and is operating the appropriate treatment.	Do not report
Failure of unfiltered systems to provide required treatment	TT	LT2E	07	72 months after the LT2ESWTR is promulgated for unfiltered systems serving ≥10,000 people that meet the filtration avoidance criteria of 40 CFR 141.71; 102 months after the LT2ESWTR is promulgated for unfiltered systems serving <10,000 people that meet the filtration avoidance criteria of 40 CFR 141.71	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the state is satisfied that system has installed and is operating the appropriate treatment.	Do not report

Violation	Type	Contaminant Code (C1103)	Type Code (C1105)	Compliance Period Begin Date (C1107)	Compliance Period End Date (C1109)	Major Violation Indicator (C1131)
Failure to conduct source water monitoring	M&R	LT2E	03	Varies depending on system size and other factors (proposed §141.701(e))	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the state is satisfied that system has completed the required source water monitoring.	Yes/No
Failure to submit a sampling schedule	M&R	LT2E	03	3 months before system is required to begin source water monitoring (initial or second round)	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the state is satisfied that system has submitted a sampling schedule.	Yes/No
Failure to collect samples in accordance with sampling schedule	M&R	LT2E	03	Day on which sample was scheduled to be collected	Last day of month in which sample should have been collected	Yes/No
Failure to sample at the appropriate location	M&R	LT2E	03	Day on which sample was taken	Day on which next sample is to be taken	Yes/No
Failure to use required analytical methods	M&R	LT2E	03	Day on which sample was taken	Day on which next sample is to be taken	Yes/No

Violation	Type	Contaminant Code (C1103)	Type Code (C1105)	Compliance Period Begin Date (C1107)	Compliance Period End Date (C1109)	Major Violation Indicator (C1131)
Failure to use approved laboratory	M&R	LT2E	03	Day on which sample was taken	Day on which next sample is to be taken	Yes/No
Failure to report results of source water monitoring (initial or second round)	M&R	LT2E	03	10 days after the end of the first month following the month the sample was taken	Day on which results are submitted to EPA/state	Yes/No
Failure to determine appropriate bin classification	M&R	LT2E	03	Based on **initial round** of source water monitoring: 36 months after rule promulgation for systems serving ≥10,000 people; 66 months after rule promulgation for systems serving <10,000 people Based on **second round** of source water monitoring: 138 months after rule promulgation for systems serving ≥10,000 people; 174 months after rule promulgation for systems serving <10,000 people	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the state is satisfied that the system has classified itself into the appropriate bin.	Yes/No

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Violation	Type	Contaminant Code (C1103)	Type Code (C1105)	Compliance Period Begin Date (C1107)	Compliance Period End Date (C1109)	Major Violation Indicator (C1131)
Failure to develop *Giardia* and virus disinfection profiles	M&R	LT2E	03	Varies depending on system size and other factors (proposed §141.712(a))	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the state is satisfied that the system has completed the required profiles.	Yes/No
Failure to report information to determine if a system must create disinfection profiles	M&R	LT2E	03	42 months after promulgation of the LT2ESWTR	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the state is satisfied that the system has submitted the information or has begun disinfection profiling.	Yes/No

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Violation	Type	Contaminant Code (C1103)	Type Code (C1105)	Compliance Period Begin Date (C1107)	Compliance Period End Date (C1109)	Major Violation Indicator (C1131)
Failure to report information about proper installation of toolbox components	M&R	LT2E	03	Varies depending on toolbox component and system size (proposed §141.730(e))	SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date. RTC is achieved when the state is satisfied that the system has reported the necessary information/has made proper demonstration.	Yes/No
Failure to maintain disinfection profiles for *Giardia* and viruses	Record-keeping	LT2E	09	Day on which system discards profile or state becomes aware the profiles have been discarded	Day on which system again retains the profiles	Do not report
Failure to maintain source water monitoring and bin classification (initial or second round)	Record-keeping	LT2E	09	Day on which system discards information or state becomes aware the information has been discarded	36 months after source water monitoring is completed	Do not report

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2.3 Treatment Technique Violations

TT violations are caused by a failure to meet TT performance requirements. Table 2-12 presents a summary of all TT violation reporting codes for the LT2ESWTR.

Table 2-12. SDWIS/FED Codes for TT Reporting Under the LT2ESWTR

Violation Code	Contaminant Code	TT Violation
07	LT2E	Failure to take necessary action regarding uncovered finished water reservoir
07	LT2E	Making a significant change in disinfection practice without state approval
07	LT2E	Failure to provide the level of treatment appropriate for the system's bin classification
07	LT2E	Failure of unfiltered systems to provide required treatment

2.3.1 Type 07/LT2E: Failure to Take Action on Uncovered Finished Water Reservoir

Cross-reference to LT2ESWTR Implementation Guidance:
Section 1, page 47
Section 5, pages 120–121
Cross-reference to Rule:
Proposed §141.724

Table 2-13. Violation Type: 07/LT2E

Violation Code	Contaminant Code	TT Violations
07	LT2E	Failure to meet one of the three criteria regarding uncovered finished water reservoirs

General Discussion of Uncovered Finished Water Reservoir Violation

The LT2ESWTR requires that systems with uncovered finished water reservoirs must: (1) cover the uncovered finished water reservoir, or (2) treat reservoir discharge to the distribution system to achieve a 4 log virus inactivation, unless (3) systems have a state-approved mitigation plan. Systems that exercise the third option (i.e., do not cover the reservoir or treat the effluent) are required to implement risk mitigation plans. These plans must address physical access, surface water runoff, animal waste (including birds), and on-going water quality assessment, and must include a schedule for plan implementation.

Systems must cover or treat uncovered finished reservoirs or have a state-approved risk mitigation plan by [insert date 36 months after rule promulgation], with the possibility of a 2-year extension granted by states for systems making capital improvements. Systems seeking approval for a risk mitigation plan must submit the plan to the state by [insert date 24 months after rule promulgation].

Example System Description - System A

System A is a Subpart H system serving 12,000 people. The system has five finished water reservoirs, two of which are uncovered.

Example #1 - Uncovered Finished Water Reservoir (TT)

On January 01, **200X [insert date 36 months after rule promulgation**], System A submits plans to the state detailing how and when it plans to cover its two uncovered finished water reservoirs.

Example #1 Decision

System A has committed a TT violation as a result of the system's failure to have both of its uncovered finished water reservoirs covered within 36 months of LT2ESWTR's promulgation (i.e., by January 01, **200X [insert date 36 months after rule promulgation**]). The system could have chosen instead to treat the discharge from its uncovered finished water reservoirs to achieve 4-log virus inactivation or to implement a state-approved risk-mitigation plan. However, since System A failed to implement any of the above options with regard to its finished water reservoirs within 36 months of LT2ESWTR's promulgation, the system is in violation of the LT2ESWTR. System A met the requirements by covering its two uncovered finished reservoirs on January 27, **200X+1 [insert date 48 months following rule promulgation**], at which time the system returned to compliance with the LT2ESWTR.

Public Notice Requirements

System A must provide Tier 2 public notice of this TT violation according to the requirements of 40 CFR 141.201.

System Reporting Requirements

There are no specific system reporting requirements for this violation.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED TT violation data elements and individual DTF transactions for a system's failure to take the required action regarding all uncovered finished water reservoirs are listed below in Table 2-14 for SDWIS Reporting Code **07/LT2E**.

Table 2-14. Uncovered Finished Water Reservoir Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	07
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date.*
C1201	Enforcement ID	*Qualifier 2*
C1203	Enforcement Date	
C1205	Follow-up Action	*SOX (State Action - compliance achieved)*
Y5000	Associated Violation ID	0200001 *(Violation ID)*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234571	0200001		I	C1103	LT2E		
D1	GA1234571	0200001		I	C1105	07		
D1	GA1234571	0200001		I	C1107	200X0101		
D1	GA1234571	0200001		I	C1109	20501231		
E1	GA1234579	0300001		I	C1203	200X+10127		
E1	GA1234579	0300001		I	C1205	SOX		
E1	GA1234579	0300001		I	Y5000	0200001		

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2.3.2 Type 07/LT2E: Prior Notification of Significant Change in Disinfection Practice TT Violation

Cross-reference to LT2ESWTR Implementation Guidance:
Section 5, pages 120–121
Cross-reference to Rule:
Proposed §141.714

Table 2-15. Violation Type: 07/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
07	LT2E	Making a significant change in disinfection practice without state approval

General Discussion of Significant Change in Disinfection Practice Violation

Systems and states must evaluate the effects of treatment changes on microbial drinking water quality through the disinfection benchmark provision. This evaluation will help ensure that systems making a significant change in their disinfection practice (in order to comply with the Stage 2 DBPR) continue to provide adequate protection against the full spectrum of microbial pathogens. While disinfection benchmarking is not intended to function as a regulatory standard, it is a tool used to facilitate discussions between the state and system for the purpose of assessing the impact on microbial risk of proposed significant changes to current disinfection practices. Final decisions regarding levels of disinfection for *Giardia lamblia* and viruses beyond those required by the SWTR that are necessary to protect public health will continue to be left to the states.

If a system that is required to produce a disinfection profile proposes to make a significant change in disinfection practice, it must calculate *Giardia lamblia* and virus benchmarks and consult with the state before implementing such a change. Significant changes in disinfection practice are defined as: (1) moving the point of disinfection (this is not intended to include routine seasonal changes already approved by the state), (2) changing the type of disinfectant, (3) changing the disinfection process, or (4) making other modifications designated as significant by the state. Supporting materials for such consultation with the state must include a description of the proposed change, the disinfection profiles and inactivation benchmarks for *Giardia lamblia* and viruses, and an analysis of how the proposed change will affect the current inactivation benchmarks.

Example System Description - System B

System B is a large Subpart H system serving 109,000 people. It currently uses a conventional filtration treatment plant as defined in 40 CFR 141.2 and chlorinates its water. System B created a disinfection profile under proposed §141.711.

Example #2 - Prior Notification of Significant Change in Disinfection Practice TT Violation

On January 1, **200X [insert date 48 months after rule promulgation]**, System B submits a plan to the state detailing modifications to its disinfection process that includes using ultraviolet (UV) as its primary disinfectant. The plan contains all the elements described in proposed §141.714(a)(6). A month later, without receiving approval of the plan from the state, contractors for System B begin construction necessary to implement the plan.

Example #2 Decision

Although System B appropriately prepared the necessary significant disinfection practice modification plan and submitted to the state by January 1, **200X [insert date 48 months after the promulgation of the LT2ESWTR**], it has committed a TT violation as a result of the system's initiation of construction of significant treatment process modifications without receiving approval from the state. The state approved System B's plans on March 1, **200X [insert date 50 months after the promulgation of the LT2ESWTR]**, returning the system to compliance.

Public Notice Requirements

As required by proposed §141.700, System B must give Tier 3 public notice of this violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirements

There are no specific system reporting requirements for this violation.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED TT violation data elements and individual DTF transactions for a system's failure to secure approval from the state before making a significant change to its disinfection practice are listed below in Table 2-16 for SDWIS Reporting Code **07/LT2E.**

Table 2-16. Disinfection Change without State Approval Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	07
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date.*
C1201	Enforcement ID	*Qualifier 2*
C1203	Enforcement Date	
C1205	Follow-up Action	*SOX (State Action - compliance achieved)*
Y5000	Associated Violation ID	*Violation ID*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234571	0400111		I	C1103	LT2E		
D1	GA1234571	0400111		I	C1105	07		
D1	GA1234571	0400111		I	C1107	200X0101		
D1	GA1234571	0400111		I	C1109	20501231		
E1	GA1234579	0200001		I	C1203	200X0301		
E1	GA1234579	0200001		I	C1205	SOX		
E1	GA1234579	0200001		I	Y5000	0400111		

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2.3.3 Type 07/LT2E: Failure to Provide the Level of Treatment Appropriate for Bin Classification

Cross-reference to LT2ESWTR Implementation Guidance:
Section 5, pages 120–121
Cross-reference to Rule:
Proposed §141.720

Table 2-17. Violation Type: 07/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
07	LT2E	Failure to provide the level of treatment appropriate for the system's bin classification (initial and second round)

General Discussion of Additional Treatment for *Cryptosporidium*

The LT2ESWTR will supplement existing regulations by mandating additional treatment at certain plants based on site-specific conditions (i.e., source water *Cryptosporidium* level). More specifically, Subpart H systems that do not provide at least 5.5 log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of bin 4 in proposed §141.720, prior to the date the system is required to begin source water monitoring must provide additional treatment for *Cryptosporidium*, which is based on the results of their source water monitoring.

Filtered systems will be assigned to one of four risk categories (or "bins"), based on the results of source water *Cryptosporidium* monitoring. Systems assigned to the lowest risk bin incur no additional treatment requirements, while systems assigned to higher risk bins must reduce *Cryptosporidium* levels beyond IESWTR and LT1ESWTR requirements. Systems will comply with additional *Cryptosporidium* treatment requirements by selecting treatment and management strategies from a "microbial toolbox" of control options. This approach targets additional treatment requirements for those systems with the highest source water *Cryptosporidium* levels and, consequently, the greatest vulnerability to this pathogen.

Plants can obtain additional *Cryptosporidium* treatment credit by implementing pretreatment processes like presedimentation or bank filtration, by developing a watershed control program (WCP), and by applying additional treatment steps like UV, ozone, chlorine dioxide, and membranes. In addition, plants can receive additional credit for existing treatment by achieving very low filter effluent turbidity or through a demonstration of performance. Systems in bin 2 can meet additional *Cryptosporidium* treatment requirements by using one or a combination of options from the microbial toolbox. In bins 3 and 4, systems must achieve at least 1 log of the additional treatment requirement using ozone, chlorine dioxide, UV, membranes, bag filtration, cartridge filtration, or bank filtration.

Example System Description - System C

System C is a small Subpart H system using GWUDI and serving 7,500 people. It currently uses a conventional filtration treatment plant as defined in 40 CFR 141.2 and uses chlorine gas as its primary disinfectant.

Example #3 - Bin Assignment and Additional Treatment

After System C finishes conducting 12 months of source water monitoring for its initial round on March 1, **200X [insert date 42 months after rule promulgation]**, the system determines that its *Cryptosporidium* bin concentration is 0.9 oocysts/L, which classifies it as bin 2. On March 1, **200X+2 [insert date 66 months after rule promulgation]**, 2 years after the system completed its first round of source water monitoring, it submits plans to the state detailing modifications to its treatment plant, including a significant change to its disinfection practice. The state approves the system's plans 6 months later on March 1, **200X+2.5 [insert date 72 months after rule promulgation]**. On March 1, **200X+3.5 [insert date 84 months after rule promulgation]**, System C installs and begins operating UV disinfection applied as the last step of treatment.

Example #3 Decision

System C is in compliance with the additional treatment requirements of proposed §141.720. As a result of the source water monitoring that the system conducts, it is placed in bin 2 and, therefore, needs to provide an additional 1 log of *Cryptosporidium* treatment. System C chooses to install UV disinfection to achieve the necessary treatment credits. Since the UV will meet *Giardia* and *Cryptosporidium* requirements, System C will decrease the amount of chlorine. The system is required to submit its plans to the state for approval. After receiving approval of its plan from the state, System C proceeds to install and operate its additional treatment. Since this treatment is operational before March 1, **200X+5 [within 102 months after promulgation**], System C is in compliance with the TT requirement of proposed §141.720.

Public Notification Requirements

Since System C is in compliance with the LT2ESWTR, no public notice is required.

System Reporting Requirements

System C is required to notify the state of its plan to make a significant change in its disinfection practice. No later than March 1, **200X+5 [insert date 102 months after rule promulgation]**, System C must also submit validation test results that demonstrate the operating conditions that are required to achieve the required UV dose. In addition, within 10 days following the end of every month, System C must submit a report to the state summarizing the percentage of water entering the distribution system that is not treated by UV reactors operating within validated conditions.

Primacy Agency to SDWIS/FED Reporting

Because the system is in compliance, no SDWIS/FED reporting is required.

Example #4 - Re-determining a System's Bin Classification

After conducting a second round of source water monitoring, System C determines that its new *Cryptosporidium* bin concentration is 1.1 oocysts/L, moving System C from bin 2 to bin 3. System C, however, provides no additional treatment for *Cryptosporidium*.

Example #4 Decision

System C has committed a TT violation. As a result of the second round of source water monitoring, System C was re-classified into bin 3. Therefore it needed to install an additional 1 log treatment for *Cryptosporidium* in order to meet the reduction to $1/10^x$ of the original concentration (2 log removal) requirement (it was already receiving one-log credit for its UV disinfection). The additional treatment needed to be operational by January 1, **200X+X**. The compliance period end date is the date on which System C installs and is operating additional treatment that equals 1 log of *Cryptosporidium* removal, or January 27, **200Y [insert date 12 months after 200X+X].**

Public Notice Requirements

System C must provide Tier 2 public notice of this TT violation according to the requirements of 40 CFR 141.201.

System Reporting Requirements

There are no specific system reporting requirements for this violation.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED TT violation data elements and individual DTF transactions for a system's failure to install and operate treatment in accordance with the system's bin classification are listed below in Table 2-18 for SDWIS Reporting Code **07/LT2E**.

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Table 2-18. Treatment Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	07
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date.*
C1201	Enforcement ID	*Qualifier 2*
C1203	Enforcement Date	
C1205	Follow-up Action	*SOX (State Action - compliance achieved)*
Y5000	Associated Violation ID	0500111 *(Violation ID)*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234571	0500111		I	C1103	LT2E		
D1	GA1234571	0500111		I	C1105	07		
D1	GA1234571	0500111		I	C1107	200X+X0101		
D1	GA1234571	0500111		I	C1109	20501231		
E1	GA1234579	0500001		I	C1203	200Y0127		
E1	GA1234579	0500001		I	C1205	SOX		
E1	GA1234579	0500001		I	Y5000	0500111		

2.4 Monitoring & Reporting Violations

Although the analytical results of source water monitoring are not reported to SDWIS/FED, violations of these requirements must be reported. To facilitate collection and analysis of large system monitoring data, EPA is developing an Internet-based electronic data collection and management system. This approach is similar to that used under the Unregulated Contaminants Monitoring Rule (UCMR). Analytical results for *Cryptosporidium*, *E. coli*, and turbidity analyses will be reported directly to this database using Web forms and software that can be downloaded free of charge. EPA will make large system monitoring data available to states when states assume primacy for the LT2ESWTR or earlier under state agreements with EPA.

Large systems will instruct their laboratories to electronically enter monitoring results into the EPA data system using Web-based manual entry forms or by uploading XML files from laboratory information management systems (LIMS). After data are submitted by a laboratory, systems may review the results on-line. If a system believes that a result was entered into the data system erroneously, the system may notify the laboratory to rectify the entry. In addition, if a system believes that a result is incorrect, the system may electronically mark (flag) the result and petition EPA or the state to invalidate the sample. If a system contests a sample result, the system must submit a rationale to EPA or the state, including a supporting statement from the laboratory, providing a justification. Systems may arrange with laboratories to review their sample results prior to the results being entered into the EPA data system. If a system determines that its laboratory does not have the capability to report data electronically, the system can submit a request to EPA to use an alternate reporting format.

M&R violations are reported for water systems failing to conduct source water monitoring (initial or second round), submit a sampling schedule for source water monitoring (initial or second round), collect a sample within 2 days of the date indicated in sampling schedule and report the results, sample at the required location, use the appropriate analytical methods, use an approved laboratory, report source water monitoring information, properly calculate and specify *Cryptosporidium* bin classification (initial and second round), develop *Giardia lamblia* and virus disinfection profiles, provide information regarding proper installation and operation of toolbox components, or submit necessary reports to determine if a system is or is not required to develop a disinfection profile. Table 2-19 presents a summary of all M&R violation reporting codes.

Table 2-19. SDWIS/FED Codes for M&R Under the LT2ESWTR

Violation Code	Contaminant Code	Monitoring & Reporting Violation
03	LT2E	Failure to conduct source water monitoring
03	LT2E	Failure to submit a sampling schedule
03	LT2E	Failure to collect samples in accordance with sampling schedule
03	LT2E	Failure to sample at the appropriate location
03	LT2E	Failure to use required analytical methods
03	LT2E	Failure to use approved laboratory
03	LT2E	Failure to report results of source water monitoring (initial or second round)
03	LT2E	Failure to determine appropriate bin classification
03	LT2E	Failure to develop *Giardia* and virus disinfection profiles
03	LT2E	Failure to report information about proper installation of toolbox components
03	LT2E	Failure to report information to determine if a system must create disinfection profiles

2.4.1 Source Water Monitoring M&R Violations

General Comments Regarding SDWIS/FED Reporting

When reporting to SDWIS/FED, the compliance period begin date for PWSs that incur this type of violation depends upon the population served by the system, other system characteristics, and the type of violation incurred. For Subpart H filtered and unfiltered systems serving 10,000 or more people, source water monitoring must begin 6 months after the LT2ESWTR is promulgated. Subpart H systems serving fewer than 10,000 people that provide filtration or are required to install filtration (filtered systems), must begin source water monitoring for *E. coli* or another state-approved indicator 30 months after the LT2ESWTR. Based on the results of that monitoring, some small filtered systems will be required to conduct source water monitoring for *Cryptosporidium* beginning [insert date 48 months after rule promulgation]. Similarly, Subpart H unfiltered systems must begin source water monitoring for *Cryptosporidium* [insert date 48 months after rule promulgation].

Large Subpart H systems conducting source water monitoring for any parameter must submit a sampling schedule to the state no later than [insert date 3 months after rule promulgation]. Small Subpart H systems conducting *E. coli* monitoring must submit a sampling schedule to the state no later than [insert date 27 months after rule promulgation]; small Subpart H systems conducting *Cryptosporidium* monitoring must submit a sampling schedule to the state no later than [insert date 45 months after rule promulgation]. All samples must be taken at the appropriate location in the system within 2 days of the dates indicated in the sampling schedule. Samples must be analyzed at a state approved laboratory using an approved analytical method. In addition, systems conducting source water monitoring must report the sample results to the state no later than 10 days after the end of the first month following the month the sample was taken.

A water system is considered out of compliance until the primacy agency is satisfied that the system has met the requirements of these provisions. Since the date the PWS regains compliance may not be known at the time the primacy agency must report to SDWIS/FED, the SDWIS/FED data system has been designed to default the compliance period date of the violation to a date in the future (December 31, 2050). When the water system regains compliance with these requirements, the primacy agency must submit an RTC enforcement action and link it to the original violation. This enforcement action date shall be when the primacy agency is satisfied that the system has met the appropriate requirements, or (in the case of a violation of using an approved laboratory, sampling on the correct day, using approved analytical methods, or sampling at the required location), the RTC date will be the date on which the next sample is taken. If a violation occurs because a system fails to take any sample, including the last sample, for source water monitoring, the RTC would be the date the system is assigned a bin classification. When this enforcement action is posted to the SDWIS/FED database and linked to the violation, the actual date of compliance replaces the default compliance period end date supplied with the original report to SDWIS/FED.

2.4.1.1 Type 03/LT2E: Failure to Conduct Source Water Monitoring (Initial or Second Round) and Report the Results M&R Violation

Cross-reference to LT2ESWTR Implementation Guidance:
Section 1, page 25
Section 5, pages 120 and 122
Cross-reference to Rule:
Proposed §141.702 and §141.707

Table 2-20. Violation Type: 03/LT2E

Violation Code	Contaminant Code	Monitoring & Reporting Violation
03	LT2E	Failure to conduct source water monitoring
03	LT2E	Failure to report results of source water monitoring (initial or second round)

General Discussion of Source Water Monitoring Requirements

Large filtered and unfiltered Subpart H systems (serving at least 10,000 people) must sample their source water at least monthly for *Cryptosporidium*, *E. coli*, and turbidity for a period of 2 years, beginning no later than [insert date 6 months after rule promulgation]. Systems may sample more frequently (e.g., twice-per-month, once-per-week), provided the same sampling frequency is used throughout the 2 year monitoring period. The purpose of requiring large systems to collect *E. coli* and turbidity data is to further evaluate these parameters as indicators of *Cryptosporidium* occurrence for small system LT2ESWTR monitoring. Source water samples must be representative of the intake to the filtration plant and must be collected prior to any treatment.

Small systems that provide filtration or are required to provide filtration must initially conduct 1 year of bi-weekly sampling (one sample every 2 weeks) for *E. coli*, beginning no later than [insert date 30 months after rule promulgation]. These systems are triggered into *Cryptosporidium* monitoring only if the initial *E. coli* monitoring indicates a mean concentration greater than 10 *E. coli*/100 mL for systems using a reservoir or lake as their primary source or greater than 50 *E. coli*/100 mL for systems using a flowing stream as their primary source. The small systems that exceed these *E. coli* trigger values, and small unfiltered systems that meet the filtration avoidance criteria of 40 CFR 141.71, must conduct 1 year of twice-per-month *Cryptosporidium* sampling beginning [insert date 48 months after rule promulgation].

Because source water monitoring by large systems (serving at least 10,000 people) will begin [insert date 6 months after rule promulgation], EPA expects to act as the primacy agency with oversight responsibility for large system sampling, analysis, and data reporting. Small systems will report monitoring results to the primacy agency during the initial round of source water monitoring. Both small and large systems will report monitoring results from the second round of monitoring to the state.

Seventy-two months after the initial bin classification, large and small systems must conduct another round of monitoring to determine if source water conditions have changed to a degree that may warrant a revised bin classification. Unless EPA modifies the LT2ESWTR to allow for an improved analytical method or a revised bin structure based on new risk information, the second round of monitoring will be

conducted under the same requirements that apply to the initial round of monitoring. Filtered systems that provide a total of at least 5.5 log of treatment for *Cryptosporidium* and unfiltered systems meeting all the filtration avoidance criteria of 40 CFR 141.71 that provide a total of at least 3 log *Cryptosporidium* inactivation are not required to conduct source water monitoring. In addition, unfiltered systems that meet all the filtration avoidance criteria of 40 CFR 141.71 or that provide a total of at least 3 log *Cryptosporidium* inactivation are not required to conduct source water monitoring. Systems that meet these criteria must notify the state no later than the date that they are required to submit a sampling schedule for monitoring.

Example System Description - System D

System D is a large Subpart H system serving 32,000 people.

Example #5 - Source Water Monitoring

On April 1, **200X [insert date 6 months after rule promulgation**], System D begins its initial round of source water monitoring. Following completion of its source water monitoring on April 1, **200X+2 [insert date 30 months after rule promulgation]**, System D is placed in bin 4. By April 1, **200X+5.5 [insert date 72 months after rule promulgation]**, System D provides the required additional treatment for *Cryptosporidium*. By April 1, **200X+8.5 [insert date 108 months after rule promulgation**], System D is still operating its additional treatment for *Cryptosporidium*, but does not begin its second round of source water monitoring.

Example #5 Decision

System D has not committed an M&R violation. Because the system installed and was operating 5.5 log treatment for *Cryptosporidium* before April 1, **200X+5.5 [insert date 72 months after rule promulgation]**, it is exempted from further source water monitoring requirements.

Public Notice Requirement

Since System D is in compliance with the LT2ESWTR, no public notice is required.

System Reporting Requirement

During the initial round of source water monitoring, System D was required to submit to EPA the information in Table 2-21. The information needed to be submitted by June 10, **200X [insert date within the first 10 days of the month following the month a sample was taken**]. The information must be reported for each *Cryptosporidium* sample analysis.

In addition to the required elements above, some systems are required to report additional information about their *Cryptosporidium* samples. For matrix spike samples, systems must also report the sample volume spiked and estimate number of oocysts. For samples in which less than 10 L is filtered or less than 100 percent of the sample volume is examined, systems must also report the number of filters used and the packed pellet volume. Finally, for samples in which less than 100 percent of sample volume is examined, systems must also report the volume of re-suspended concentrate and volume of this resuspension processed through immunomagnetic separation.

For every *E. coli* sample System D took as part of its required source water monitoring program, it was required to submit the information in Table 2-22 to EPA by June 10, 200X [insert date 10 days after the month following the month the sample was taken].

Table 2-21. Source Water Monitoring - *Cryptosporidium* - Reporting Requirements

Data element
PWSID
Facility ID
Sample collection point
Sample collection date
Sample type (field or matrix spike)
Sample volume filtered (L), to nearest 1/4 L
If 100% of filtered volume examined
Number of oocysts counted

Table 2-22. Source Water Monitoring - *E. coli* - Reporting Requirements

Data element
PWSID
Facility ID
Sample collection point
Sample collection date
Analytical method number
Method type
Flowing stream or lake/reservoir
E. coli/100 mL
Turbidity[1]

[1] Systems serving fewer than 10,000 people that are not required to monitor for turbidity are not required to report this parameter with their *E. coli* results.

Primacy Agency to SDWIS/FED Reporting

Because the system is in compliance, no SDWIS/FED reporting is required.

Example System Description - System E

System E is a small surface water system serving 3,000 people that uses a small lake as a source.

Example #6 - Source Water Monitoring M&R Violation

System E begins conducting *E. coli* monitoring on January 1, **200X [insert date 30 months after rule promulgation**]. Based on the results of that monitoring, System E determines that its annual mean *E. coli* concentration is 31 *E. coli*/100 mL. System E does not conduct any further source water monitoring.

Example #6 Decision

System E has committed an M&R violation. Based on the annual mean concentration of *E. coli* determined by the initial source water monitoring (31 *E. coli*/100 mL is greater than 10 *E. coli*/100 mL), System E is required to begin source water monitoring for *Cryptosporidium* at least twice each month no later than January 1, **200X+1.5 [insert date 48 months after rule promulgation**]. Not doing so is an M&R violation and leads to the classification of the system into bin 4.

Public Notice Requirement

System E must provide Tier 3 public notice of this violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirement

There are no specific system reporting requirements for this violation. System E must, however, report the results of its *E. coli* monitoring to the state no later than 10 days after the end of the month following the month in which the sample was taken. The report must include the elements found in Table 2-10 above.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED source water monitoring M&R violation data elements and DTF transactions are listed below in Table 2-23 for SDWIS Reporting Code **03/LT2E**.

Table 2-23. Source Water Monitoring (Initial or Second Round) and Reporting M&R Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*Day on which next sample is to be taken*
C1131	Major Violation Flag	Y *or* N

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	0600001		I	C1103	LT2E		
D1	GA1234579	0600001		I	C1105	03		
D1	GA1234579	0600001		I	C1107	200X+1.50101		
D1	GA1234579	0600001		I	C1109	200X+1.50131		
D1	GA1234579	0600001		I	C1131	X		

2.4.1.2 Type 03/LT2E: Failure to Submit a Source Water Monitoring Schedule 3 Months Prior to Date System is Required to Begin Monitoring M&R Violation

Cross-reference to LT2ESWTR Implementation Guidance:
Section 5, pages 120 and 122
Cross-reference to Rule:
Proposed §141.703(a)

Table 2-24. Violation Type: 03/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
03	LT2E	Failure to submit a sampling schedule

Example System Description - System F

System F is an unfiltered Subpart H system serving 2,500 people that meets all the criteria for avoiding filtration found in 40 CFR 141.71.

Example #7 - Sampling Schedule M&R Violation

System F submits a sampling schedule to the state for the initial round of source water monitoring January 1, **200X [insert date 45 months after rule promulgation]**, however, it forgets about the second round of source water monitoring that is required and does not submit a sampling schedule. On February 1, **200X+9 [insert date 155 months after rule promulgation**], one month before System F is required to begin the second round of source water monitoring, a neighboring water system reminds System F that it is required to conduct a second round of source water monitoring. System F develops a sampling schedule and fulfills its source water M&R requirements in accordance with the schedule in proposed §141.702(d)(3).

Example #7 Decision

System F has committed a M&R violation for failing to submit a sampling schedule to the state for the second round of source water monitoring before October 1, **200X+8 [insert date within 153 months of the LT2ESWR's promulgation**] (i.e., 3 months before the second round of source water monitoring), even though it conducted the required monitoring and reported the results to the state. System F has continued to fail to submit this sampling schedule to the state.

Public Notice Requirement

System F must provide Tier 3 public notice of this violation in accordance with the requirements of 40 CFR 141.201.

System Reporting Requirement

There are no system reporting requirements for this M&R violation.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED sampling schedule M&R violation data elements and DTF transactions are listed below in Table 2-25 for SDWIS Reporting Code **03/LT2E**.

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Table 2-25. Source Water Monitoring Schedule Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date.*
C1131	Major Violation Flag	Y *or* N

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	0700111		I	C1103	LT2E		
D1	GA1234579	0700111		I	C1105	03		
D1	GA1234579	0700111		I	C1107	200X+81001		
D1	GA1234579	0700111		I	C1109	20501231		
D1	GA1234579	0700111		I	C1131	X		

2.4.1.3 Type 03/LT2E: Failure to Collect Samples in Accordance with Sampling Schedule M&R Violation

Cross-reference to LT2ESWTR Implementation Guidance:
Section 5, pages 120 and 122
Cross-reference to Rule:
Proposed §141.703(b)-(d)

Table 2-26. Violation Type: 03/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
03	LT2E	Failure to collect samples in accordance with sampling schedule

Example System Description - System G

System G is a small Subpart H system serving 9,000 people.

Example #8 - Sample Collection M&R Violation

System G has two certified operators. While System G is conducting its required source water monitoring for *E. coli*, the operator that usually collects the bi-weekly *E. coli* sample goes on vacation for 1 month. System G's other operator decides to wait until his/her colleague returns to work to continue the required source water monitoring instead of collecting the samples on his/her own.

Example #8 Decision

System G has committed an M&R violation for failing to sample within 2 days of the scheduled date, March 1, **200X [insert date 30 months after rule promulgation]**. Proposed §141.703(c) allows systems that face "extreme conditions," situations "that may pose danger to the sampler," "unforseen" situations, or situations that "cannot be avoided" to sample as close to the scheduled date as is feasible and to submit an explanation for the alternative sampling date with the analytical results. A vacationing operator does not satisfy any of the requirements of proposed §141.703(c).

Public Notice Requirement

System G must provide Tier 3 public notice of this violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirement

There are no system specific reporting requirements for this violation. System G is required, however, to submit the results of every *E. coli* sample to the state.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED sample collection M&R violation data elements and DTF transactions are listed below in Table 2-27 for SDWIS Reporting Code **03/LT2E**.

Table 2-27. Sample Collection Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*The last day of the month in which the sample should have been collected.*
C1131	Major Violation Flag	Y *or* N

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	0800001		I	C1103	LT2E		
D1	GA1234579	0800001		I	C1105	03		
D1	GA1234579	0800001		I	C1107	200X0301		
D1	GA1234579	0800001		I	C1109	200X0331		
D1	GA1234579	0800001		I	C1131	X		

2.4.1.4 Type 03/LT2E: Failure to Sample at an Appropriate Location M&R Violation

Cross-reference to LT2ESWTR Implementation Guidance:
Section 1, page 25
Section 5, page 123
Cross-reference to Rule:
Proposed §141.704

Table 2-28. Violation Type: 03/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
03	LT2E	Failure to sample at the appropriate location

General Discussion on Source Water Monitoring Sampling Locations

Source water samples must be representative of the intake to the filtration plant and must be collected prior to any treatment, with the following exceptions.

Systems with presedimentation in place at the time they begin LT2ESWTR *Cryptosporidium* monitoring are not eligible for the 0.5 log credit and must sample after the basin (but before any other treatment) for the purpose of determining their bin assignment. The use of presedimentation during LT2ESWTR

monitoring must be consistent with routine plant operation and must be recorded by the system. Identification of appropriate monitoring locations is further described in the *Draft Source Water Monitoring Guidance Manual for Public Water Systems for the LT2ESWTR* (EPA 815-D-03-005, June, 2003).

A system using existing bank filtration as pretreatment to a filtration plant at the time it is required to conduct *Cryptosporidium* monitoring must sample the well effluent for the purpose of determining bin classification. This system, however, is not eligible to receive additional credit for bank filtration. Systems using bank filtration as an alternative filtration demonstration to comply with 40 CFR 141.173(b) or 141.552(a) must sample the surface water to determine bin classification. (This requirement does not apply to existing primacy agency actions to provide alternative treatment credit to systems determined to be GWUDI under 40 CFR 141.73(d).) Finally, unfiltered systems using GWUDI that meet all the criteria for avoiding filtration in 40 CFR 141.71 must collect source water monitoring samples from the well.

Systems with off-stream raw water storage must conduct *Cryptosporidium* monitoring after the raw water reservoir for the purpose of determining LT2ESWTR bin placement. This will allow reductions in *Cryptosporidium* levels that occur through off-stream storage to be reflected in the monitoring results and consequent LT2ESWTR bin assignment. The use of off-stream raw water storage reservoirs during LT2ESWTR monitoring must be consistent with routine plant operation and must be recorded by the system.

Example System Description - System H

System H is a large Subpart H system serving 15,000 people. System H uses bank filtration to meet the requirement of 40 CFR 141.173(b).

Example #9 - Sampling Location M&R Violation

On May 1, **200X [insert date 6 months after rule promulgation]**, System H begins to conduct monitoring for *Cryptosporidium*. System H collects its first five samples from the well, after bank filtration.

Example #9 Decision

System H has committed an M&R violation. Systems using bank filtration as an alternative filtration to meet the requirements of 40 CFR 141.173(b) or 141.552(a) must take surface water samples. Only unfiltered GWUDI systems meeting the filtration avoidance criteria in 40 CFR 141.71 and bank filtered systems that provide additional filtration can collect samples from the well (after bank filtration).

Public Notice Requirement

System H must provide Tier 3 public notice of this violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirement

There are no system-specific reporting requirements for this violation. System H must, however, report the results of each *Cryptosporidium* and *E. coli* sample to EPA. Each report must contain the data elements listed in Tables 2-21 and 2-22, respectively.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED sampling location M&R violation data elements and DTF transactions are listed below in Table 2-29 for SDWIS Reporting Code 03/LT2E.

Table 2-29. Sample Location Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*Day on which next sample is to be taken*
C1131	Major Violation Flag	Y *or* N

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	0900001		I	C1103	LT2E		
D1	GA1234579	0900001		I	C1105	03		
D1	GA1234579	0900001		I	C1107	200X0501		
D1	GA1234579	0900001		I	C1109	200X0531		
D1	GA1234579	0900001		I	C1131	X		

2.4.1.5 Type 03/LT2E: Failure to Use an Approved Laboratory or Approved Analytical Method M&R Violation

Cross-reference to LT2ESWTR Implementation Guidance:

Section 5, pages 120 and 123

Cross-reference to Rule:

Proposed §141.706 and §141.705

Table 2-30. Violation Type: 03/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
03	LT2E	Failure to use an approved laboratory to analyze source water samples
03	LT2E	Failure to use required methods to analyze source water samples

General Discussion of Analytical Methods and Approved Laboratory Requirements

For each *Cryptosporidium* sample, all systems must analyze at least a 10 liter (L) sample volume. Systems may collect and analyze greater than a 10 L sample volume as long as the system consistently attempts to analyze the larger sample volume throughout the monitoring period. In cases where it is not feasible for a system to process a 10 L sample for *Cryptosporidium* analysis (e.g., filter clogs prior to filtration of 10 L), the system must analyze as much sample volume as can be filtered by 2 filters, up to a packed pellet volume of 2 mL. This condition applies only to filters that have been approved by EPA for nationwide use with Methods 1622/1623—the Pall Gelman Envirochek™ and Envirochek™ HV filters, the IDEXX FiltaMax™ foam filter, and the Whatman CrypTest™ cartridge filter. Systems must have one matrix spike sample analyzed for each 20 source water samples. Matrix spike samples must be spiked and filtered in the laboratory. The sample volume of the matrix spike must be within 10 percent of the volume of the unspiked sample. The matrix spike sample and the associated unspiked sample must be analyzed by the same procedure.

For enumerating source water *E. coli* density under the LT2ESWTR, the *Guidelines Establishing Test Procedures for the Analysis of Pollutants; Analytical Methods for Biological Pollutants in Ambient Water* (66 *FR* 45811, August 30, 2001) should be used. In addition, the LT2ESWTR allows for a longer holding time for *E. coli* samples than the current SWTR requirements (40 CFR 141.74(a)). The holding time refers to the time between sample collection and initiation of analysis. The LT2ESWTR extends the holding time from 8 to 24 hours for *E. coli* samples, as long as the samples are kept below 10°C during transit and are not allowed to freeze.

For turbidity analyses conducted under the LT2ESWTR, the analytical methods that have been previously approved by EPA for analysis of turbidity in drinking water, as listed in 40 CFR 141.74, should be used.

Given the potentially significant implications in terms of both cost and public health protection of microbial monitoring under the LT2ESWTR, laboratory analyses for *Cryptosporidium*, *E. coli*, and turbidity must be accurate and reliable within the limits of approved methods. Therefore, PWSs must use laboratories that have been approved by EPA or the state to conduct analyses for these parameters.

Example System Description - System I

System I is a large Subpart H system serving 50,000 people. System I has its own on-site laboratory that has been approved by the state for *Cryptosporidium*, *E. coli*, and turbidity analysis.

Example #10 - Analytical Method M&R Violation

System I usually collects its monthly *E. coli* sample on the last Wednesday afternoon of the month and analyzes it the following morning. Overnight the sample is kept at 5˚C. During the month of July, however, the operator who usually analyzes the samples was sick on the Thursday following the *E. coli* sample's collection. When the operator returned to work on Friday, the sample is analyzed for the *E. coli*.

Example #10 Decision

Although the *E. coli* sample was kept between 0˚C and 5˚C, System I has committed an M&R violation because it was not analyzed within 24 hours of the sample's collection. The *E. coli* sample is invalid because the holding time was longer than 24 hours, the maximum holding time allowed by the LT2ESWTR. The system takes and analyzes another sample on August 26, 200X.

Public Notice Requirement

System I must give Tier 3 public notice of this violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirement

There are no system-specific reporting requirements for this violation. If System I had not been able to submit a valid *Cryptosporidium* sample result due to a failure to comply with the analytical method requirements, it would be required to collect a replacement sample within 14 days of being notified that the sample result could not be reported. When the results of a replacement *Cryptosporidium* sample are reported, the system must also provide an explanation for the replacement sample.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED analytical method M&R violation data elements and DTF transactions are listed below in Table 2-31 for SDWIS Reporting Code 03/LT2E.

Table 2-31. Approved Laboratory or Approved Analytical Method M&R Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*Day on which next sample is to be taken*
C1131	Major Violation Flag	Y *or* N

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	1000001		I	C1103	LT2E		
D1	GA1234579	1000001		I	C1105	03		
D1	GA1234579	1000001		I	C1107	200X0727		
D1	GA1234579	1000001		I	C1109	200X0826		
D1	GA1234579	1000001		I	C1131	X		

2.4.2 Type 03/LT2E: Determining a System's Appropriate Bin Classification M&R Violation

Cross-reference to LT2ESWTR Implementation Guidance:
Section 5, page 123
Cross-reference to Rule:
Proposed §141.709 and §141.730

Table 2-32. Violation Type: 03/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
03	LT2E	Failure to determine appropriate bin classification

General Discussion of Bin Classification

Filtered systems will be assigned to one of four risk categories (or "bins"), based on the results of source water *Cryptosporidium* monitoring. Systems assigned to the lowest risk bin incur no additional treatment requirements, while systems assigned to higher risk bins must reduce *Cryptosporidium* levels beyond

IESWTR and LT1ESWTR requirements. Bin classification is determined by averaging the *Cryptosporidium* concentrations measured for individual samples.

Table 2-33. Bin Classification Table for Filtered Systems

If your average *Cryptosporidium* concentration[1] is...	**Then your bin classification is...**
Cryptosporidium < 0.075/L	Bin 1
0.075/L ≤ *Cryptosporidium* < 1.0/L	Bin 2
1.0/L ≤ *Cryptosporidium* < 3.0/L	Bin 3
Cryptosporidium ≥ 3.0/L	Bin 4

[1]All concentrations shown in units of oocysts/L

The approach that systems will use to average individual sample concentrations to determine their bin classification depends on the number of samples collected and the length of the monitoring period. Systems serving at least 10,000 people are required to monitor for 24 months. Their calculation for bin classification depends on the number of samples collected, according to the following:

(1) highest 12 month annual average for systems collecting 24-47 samples; or,

(2) 2 year mean, if system conducts twice-per-month or more frequent sampling for 24 months (i.e., at least 48 samples).

Systems that exceed the *E. coli* trigger level and serve fewer than 10,000 people are required to collect 24 *Cryptosporidium* samples over 12 months, and their bin classification must be based on the mean of the 24 samples. Systems that fail to collect at least 24 samples over 1 year to meet the *Cryptosporidium* monitoring requirements will be classified in bin 4.

Subpart H systems that serve at least 10,000 people must report their initial mean *Cryptosporidium* concentration and their initial bin classification to the state no later than 36 months after the LT2ESWTR is promulgated, and they must report their mean *Cryptosporidium* concentration and bin classification determined using results from the second round of source water monitoring no later than [**insert date 138 months after rule promulgation**]. Systems serving fewer than 10,000 people must report their initial mean *Cryptosporidium* concentration and their initial bin classification no later than [**insert date 66 months after rule promulgation**], and they must report their mean *Cryptosporidium* concentration and bin classification determined using results from the second round of source water monitoring no later than [**insert date 174 months after rule promulgation**].

Example System Description - System J

System J is a large Subpart H system serving 20,000 people. It treats surface water using a slow sand filtration plant.

Example #11 - Bin Classification M&R Violation

System J takes the minimum number of source water *Cryptosporidium* samples that it is required to take. Table 2-34 shows the *Cryptosporidium* concentrations of each sample taken.

Table 2-34. System J Source Water Monitoring Summary

Number of Months after Rule Promulgation	*Cryptosporidium* Concentration (oocycst/L)	Average of Previous 12 Months	Number of Months after Rule Promulgation	*Cryptosporidium* Concentration (oocycst/L)	Average of Previous 12 Months
6	0.09	NA	18	0	0.058
7	0.1	NA	19	0	0.050
8	0.08	NA	20	0.06	0.048
9	0.07	NA	21	0.09	0.050
10	0.07	NA	22	0	0.044
11	0.07	NA	23	0	0.038
12	0.08	NA	24	0.08	0.038
13	0.09	NA	25	0.09	0.038
14	0.08	NA	26	0.1	0.040
15	0.06	NA	27	0.2	0.052
16	0	NA	28	0.2	0.068
17	0	0.066	29	0.1	0.077

Based on these results, System J determines that it should be classified as a bin 1 system because the average of all of its samples is less than 0.075 oocysts/L. System J reports its initial mean *Cryptosporidium* concentration and its initial bin classification to the state on January 1, 200X [insert date 30 months after rule promulgation].

Example #11 Decision

Although System J has reported its initial mean concentration and bin classification before June 1, 200X [insert date 36 months after rule promulgation], the system has incorrectly classified itself as a bin 1 system. Because System J serves at least 10,000 people and collected between 24 and 47 samples, its bin classification is based on the highest annual average of all sample concentrations in any 12 consecutive

months. During the second 12 months that System J conducted source water monitoring, the average *Cryptosporidium* concentration was 0.077 oocysts/L. Therefore, even though the average of all the samples was less than 0.075 oocysts/L, System J is actually classified as a bin 2 System. System J reclassified itself as a bin 2 on July 1, 200X.

Public Notice Requirement

System J does not have to provide public notice of its misclassification. However, if System J continues to classify itself as a bin 1 system and provides no additional treatment for *Cryptosporidium*, it will commit a TT violation. System J would then be required to give Tier 2 public notice of its TT violation.

System Reporting Requirement

There are no reporting requirements associated with determining a system's bin classification.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED bin classification M&R violation data elements and DTF transactions are listed below in Table 2-35 for SDWIS Reporting Code 03/LT2E.

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Table 2-35. Bin Classification M&R Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date.*
C1131	Major Violation Flag	Y *or* N
C1201	Enforcement ID	*Qualifier 2*
C1203	Enforcement Date	
C1205	Follow-up Action	*SOX (State Action - compliance achieved)*
Y5000	Associated Violation ID	1100111 *(Violation ID)*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	1100111		I	C1103	LT2E		
D1	GA1234579	1100111		I	C1105	03		
D1	GA1234579	1100111		I	C1107	200X0601		
D1	GA1234579	1100111		I	C1109	20501231		
D1	GA1234579	1100111		I	C1131	X		
E1	GA1234579	1100001		I	C1203	200X0701		
E1	GA1234579	1100001		I	C1205	SOX		
E1	GA1234579	1100001		I	Y5000	1100111		

2.4.3 Disinfection Profiling M&R Violations

General Comments Regarding Disinfection Profiling Requirements

The purpose of disinfection profiling and benchmarking is to ensure that when a system makes a significant change to its disinfection practice, it does not compromise the adequacy of existing microbial protection. The profiling and benchmarking requirements of the LT2ESWTR are similar to those

promulgated under the IESWTR and LT1ESWTR. Systems that meet specified criteria must prepare disinfection profiles that characterize current levels of virus and *Giardia lamblia* inactivation over the course of 12 months.

Systems that developed disinfection profiles under the IESWTR or LT1ESWTR and have not made significant changes to their disinfection practice or changed sources are not required to collect additional operational data to create disinfection profiles under the LT2ESWTR. This will permit most systems that prepared a disinfection profile under the IESWTR or the LT1ESWTR to avoid collecting any new operational data to develop profiles under the LT2ESWTR. Systems that produced a disinfection profile for *Giardia lamblia* but not for viruses under the IESWTR or LT1ESWTR may be required to develop a profile for viruses under the LT2ESWTR. Where a previously developed *Giardia lamblia* profile is acceptable, systems may develop a virus profile using the same operational data (i.e., contact time (CT) values) on which the *Giardia lamblia* profile is based.

To develop disinfection profiles under the LT2ESWTR, systems are required to exercise one of the following three options:

> Option 1 - Systems conduct monitoring at least once per week over a period of at least 1 year to determine *Giardia lamblia* and virus log inactivation levels based on operational and water quality data (disinfectant residual concentration(s), CT(s), temperature(s), and, where necessary, pH);
>
> Option 2 - Systems that conduct monitoring under the LT2ESWTR, as described under Option 1, can also use 1 or 2 years of acceptable grandfathered data, in addition to 1 year of new operational data, in developing the disinfection profile; or,
>
> Option 3 - Systems that have at least 1 year of acceptable existing operational data are not required to conduct new monitoring to develop the disinfection profile under the LT2ESWTR. Instead, they can use a disinfection profile based on 1 to 3 years of grandfathered data.

The determination of whether a system is required to develop a disinfection profile is based on whether the system is required to monitor for *Cryptosporidium* and whether it is a Subpart H system with DBP levels (TTHM or HAA5) that exceed specified values. These criteria trigger profiling because they identify systems that may be required to make treatment changes under the Stage 2 DBPR and LT2ESWTR.

Unless the system developed a disinfection profile under the IESWTR or LT1ESWTR, all systems required to monitor for *Cryptosporidium* must develop *Giardia lamblia* and virus disinfection profiles under the LT2ESWTR. These systems include all surface water systems except (1) systems that provide 5.5 log total treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of bin 4, and (2) small systems (fewer than 10,000 people served) that do not exceed the *E. coli* trigger. Systems providing 5.5 log of treatment are not required to monitor for *Cryptosporidium* and do not need to prepare disinfection profiles.

Small CWSs or NTNCWSs using surface water or GWUDI that do not exceed the *E. coli* trigger are required to prepare *Giardia lamblia* and virus disinfection profiles if one of the following criteria apply (based on DBP levels in their distribution systems):

1) TTHM levels in the distribution system, based on samples collected for compliance with Stage 1 Disinfection and Disinfection Byproducts Rule (Stage 1 DBPR), are at least 80 percent of the MCL (0.064 mg/L) at any Stage 1 DBPR sampling point based on a LRAA; or

2) HAA5 levels in the distribution system, based on the samples collected for compliance with Stage 1 DBPR, are at least 80 percent of the MCL (0.048 mg/L) at any Stage 1 DBPR sampling point based on an LRAA.

2.4.3.1 Type 03/LT2E: Failure to Develop *Giardia* and Virus Disinfection Profiles M&R Violation

Cross-reference to LT2ESWTR Implementation Guidance:
Section 1, pages 26–27
Section 5, pages 120 and 124
Cross-reference to Rule:
Proposed §141.713

Table 2-36. Violation Type: 03/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
03	LT2E	Failure to develop *Giardia* and virus disinfection profiles

Example System Description - System K

System K is a small GWUDI system serving 4,500 people.

Example #12 - Disinfection Profiling M&R Violation

Based on the results of its *E. coli* monitoring, System K was required to conduct source water monitoring for *Cryptosporidium*. However, System K's LRAA for TTHM was less than 0.064 mg/L at every monitoring site, and its LRAA for HAA5 was less than 0.048 mg/L at every monitoring site. Based on these DBP averages, System K determined that it did not need to conduct disinfection profiling.

Example #12 Decision

System K has committed an M&R violation. While its DBP levels are below the disinfection profiling triggers, the system is required to conduct source water monitoring for *Cryptosporidium*. Systems serving fewer than 10,000 people are required to create a disinfection profile under the LT2ESWTR by July 1, 200X [insert date 66 months after rule promulgation] if they are required to conduct source water monitoring for *Cryptosporidium* and have not developed a disinfection profile under the LT1ESWTR, or

if their LRAAs exceed specified values for TTHM and HAA5. System K developed its disinfection profile and submitted it to the state on October 31, 200X, returning the system to compliance.

Public Notice Requirement

System K must provide Tier 3 public notice for this M&R violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirement

There are no system-specific reporting requirements for this violation.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED Disinfection Profiling M&R violation data elements and DTF transactions are listed below in Table 2-37 for SDWIS Reporting Code 03/LT2E.

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Table 2-37. Developing Disinfection Profile M&R Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date.*
C1131	Major Violation Flag	Y *or* N
C1201	Enforcement ID	*Qualifier 2*
C1203	Enforcement Date	
C1205	Follow-up Action	*SOX (State Action - compliance achieved)*
Y5000	Associated Violation ID	1200111 *(Violation ID)*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	1200111		I	C1103	LT2E		
D1	GA1234579	1200111		I	C1105	03		
D1	GA1234579	1200111		I	C1107	200X0701		
D1	GA1234579	1100111		I	C1109	20501231		
D1	GA1234579	1200111		I	C1131	X		
E1	GA1234579	1200001		I	C1203	200X1031		
E1	GA1234579	1200001		I	C1205	SOX		
E1	GA1234579	1200001		I	Y5000	1200111		

Example System Description - System L

System L is a small Subpart H system serving 3,000 people. System L currently applies chlorine as a disinfectant prior to flocculation/sedimentation. System L is considering moving its point of disinfection and applying chlorine after the sedimentation basin.

Example #13 - Grandfathered Data

Based on the results of source water *E. coli* monitoring, System L is required to monitor for *Cryptosporidium*. As a result, System L is required to create a disinfection profile for *Giardia lamblia* and viruses by July 1, 200X [insert date 66 months after rule promulgation]. System L elects to conduct no additional monitoring to comply with the disinfection profiling requirements of the LT2ESWTR. Instead, it uses data collected prior to the change in point of disinfection (i.e., when the system applied chlorine before flocculation/sedimentation) to create a disinfection profile for viruses in accordance with the methods approved by the state.

Example #13 Decision

System L has failed to comply with the disinfection profiling requirements of the LT2ESWTR. While System L did not change sources, it did make a significant change in its treatment practice by moving its point of disinfection in between the time it collected the disinfection profiling data and the time it was required to create disinfection profiles. Therefore, System L has committed an M&R violation since the use of grandfathered data is not acceptable.

Public Notice Requirements

System L must provide Tier 3 public notice of the M&R violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirements

System L is required to notify the state of its plan to make a significant change in its disinfection practice. Since System L has to monitor for *Cryptosporidium*, it is not required to report data on its TTHM and HAA5 LRAAs. It must, however, receive approval from the state within 54 months of the LT2ESWTR promulgation to use its existing profiles. System L is also required to complete both of its disinfection profiles no later than 66 months after the LT2ESWTR promulgation.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED Disinfection Profiling M&R violation data elements and DTF transactions are listed above in Table 2-38 for SDWIS Reporting Code 03/LT2E.

Table 2-38. Disinfection Profile M&R Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date.*
C1131	Major Violation Flag	Y *or* N

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	1200111		I	C1103	LT2E		
D1	GA1234579	1200111		I	C1105	03		
D1	GA1234579	1200111		I	C1107	200X1031		
D1	GA1234579	1100111		I	C1109	20501231		
D1	GA1234579	1200111		I	C1131	X		

2.4.3.2 Type 03/LT2E: Failure to Report Information to Determine if a System Must Create a Disinfection Profile M&R Violation

Cross-reference to LT2ESWTR Implementation Guidance:

Section 5, pages 120 and 124

Cross-reference to Rule:

Proposed §141.711 and §141.712(a)

Table 2-39. Violation Type: 03/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
03	LT2E	Failure to submit reports necessary to determine if system is or is not required to develop disinfection profile

Within 42 months after the LT2ESWTR is promulgated, Subpart H systems serving fewer than 10,000 people that are not required to monitor for *Cryptosporidium* must report to the state their TTHM and HAA5 LRAAs and whether the disinfection profiling requirements apply. The LRAAs reported must be based on 1 year of DBP data collected during the period following promulgation of the LT2ESWTR or as determined by the state. If the TTHM annual average at any sampling point is at least 0.064 mg/L or the HAA5 annual average at any sampling point is at least 0.048 mg/L, the system must begin disinfection profiling 54 months after the LT2ESWTR is promulgated.

Example System Description - System M

System M uses GWUDI and serves 8,000 people.

Example #14 - DBP Reporting M&R Violation

Based on monitoring to comply with the Stage 1 DBPR, System M determines that its highest LRAA for TTHM is less than 0.064 mg/L and its highest LRAA for HAA5 is less than 0.048 mg/L. Based on this, System M decides it does not have to create disinfection profiles under the LT2ESWTR. Thinking that all of its obligations are satisfied, System M does not report any information to the state regarding its DBP averages.

Example #14 Decision

System M has committed an M&R violation. Every Subpart H system serving fewer than 10,000 people that does not have to monitor for *Cryptosporidium* has to submit a report on its DBP averages to the state no later than July 1, 200X [insert date 42 months after rule promulgation]. Even though System M's DBP averages are below the triggers for disinfection profiling, it still has to report that information to the state. System M finally submits the report to the state on February 1, 200X+1.

Public Notice Requirement

System M must provide Tier 3 public notice of this violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirement

There are no system specific reporting requirements for this violation.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED DBP reporting M&R violation data elements and DTF transactions are listed below in Table 2-40 for SDWIS Reporting Code 03/LT2E.

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Table 2-40. Disinfection Profile M&R Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*SDWIS/FED will default to 12/31/2050. A state associating an RTC enforcement to this violation will cause SDWIS/FED to adjust the end date to the RTC date.*
C1131	Major Violation Flag	Y *or* N
C1201	Enforcement ID	*Qualifier 2*
C1203	Enforcement Date	
C1205	Follow-up Action	*SOX (State Action - compliance achieved)*
Y5000	Associated Violation ID	1300111 *(Violation ID)*

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	1300111		I	C1103	LT2E		
D1	GA1234579	1300111		I	C1105	03		
D1	GA1234579	1300111		I	C1107	200X0701		
D1	GA1234579	1300111		I	C1107	200501231		
D1	GA1234579	1300111		I	C1131	X		
E1	GA1234579	1300001		I	C1203	200X+10201		
E1	GA1234579	1300001		I	C1205	SOX		
E1	GA1234579	1300001		I	Y5000	1300111		

2.4.4 Type 03/LT2E: Failure to Report Information About Toolbox Components M&R Violation

Cross-reference to LT2ESWTR Implementation Guidance:
Section 5, pages 120 and 124
Cross-reference to Rule:
Proposed §141.730(e)

Table 2-41. Violation Type: 03/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
03	LT2E	Failure to report information about proper installation of toolbox components

Under the LT2ESWTR, systems may choose from a "toolbox" of management and treatment options to meet their additional *Cryptosporidium* treatment requirements. In order to receive credit for toolbox components, systems must initially demonstrate that they comply with all required design and implementation criteria, including performance validation testing. Additionally, systems must provide monthly verification of compliance with any required operational criteria, as shown through ongoing monitoring. The reporting requirements associated with these criteria are shown in Table 2-42 for both large and small systems.

Table 2-42. Toolbox Reporting Requirements

Toolbox Option (Potential *Cryptosporidium* Reduction Log Credit)	Systems Must Submit the Following Items to the State	On the Following Schedule[1] (Systems Serving ≥10,000 People)	On the Following Schedule[1] (Systems Serving <10,000 People)
Watershed Control Program (0.5 log)	Notification of intention to develop WCP	No later than 48 months after promulgation	No later than 78 months after promulgation
	Initial WCP plan	No later than 60 months after promulgation	No later than 90 months after promulgation
	Annual program status report and state-approved watershed survey report	Every 12 months, beginning 84 months after promulgation	Every 12 months, beginning 114 months after promulgation

Toolbox Option (Potential *Cryptosporidium* Reduction Log Credit)	Systems Must Submit the Following Items to the State	On the Following Schedule[1] (Systems Serving ≥10,000 People)	On the Following Schedule[1] (Systems Serving <10,000 People)
Watershed Control Program (0.5 log)	Request for re-approval and report on the previous approval period	No later than 6 months prior to the end of the current approval period	No later than 6 months prior to the end of the current approval period
Pre-sedimentation (0.5 log) (new basins)	Monthly verification of: • Continuous basin operation • Treatment of 100% of the flow • Continuous addition of a coagulant • At least 0.5 log removal of influent turbidity based on the monthly mean of daily turbidity readings for 11 of the 12 previous months	Monthly reporting within the first 10 days of the month following the month in which the monitoring was conducted, beginning 72 months after promulgation	Monthly reporting within the first 10 days of the month following the month in which the monitoring was conducted, beginning 102 months after promulgation
Two-stage Lime Softening (0.5 log)	Monthly verification of: • Continuous operation of a second clarification step between the primary clarifier and filter • Continuous presence of coagulant (may be lime) in first and second stage clarifiers • Both clarifiers treat 100% of the plant flow	No later than 72 months after promulgation	No later than 102 months after promulgation
Bank Filtration (0.5 or 1.0 log) (new)	Initial demonstration of: • Unconsolidated, predominantly sandy aquifer • Setback distance of ≥ 25 ft. (0.5 log) or 50 ft. (1.0 log)	Initial demonstration no later than 72 months after promulgation	Initial demonstration no later than 102 months after promulgation
	If monthly average of daily max turbidity is > 1 NTU, system must report the result and submit an assessment of the cause for the high turbidity	Monthly reporting within 30 days following the month in which the monitoring was conducted, beginning 72 months after promulgation	Monthly reporting within 30 days following the month in which the monitoring was conducted, beginning 102 months after promulgation

Toolbox Option (Potential *Cryptosporidium* Reduction Log Credit)	Systems Must Submit the Following Items to the State	On the Following Schedule[1] (Systems Serving ≥10,000 People)	On the Following Schedule[1] (Systems Serving <10,000 People)
Combined Filter Performance (0.5 log)	Monthly verification of combined filter effluent (CFE) turbidity levels ≤ 0.15 NTU in at least 95% of the 4 hour CFE measurements taken each month	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning 72 months after promulgation	Monthly reporting: within 10 days following the month in which the monitoring was conducted, beginning 102 months after promulgation
Membranes (microfiltration, ultrafiltration, nanofiltration, reverse osmosis) (log credit based on verification/ integrity testing)	Initial demonstration of: • Removal efficiency through challenge studies • Methods of challenge studies meet rule criteria • Integrity test results and baseline	No later than 72 months after promulgation	No later than 102 months after promulgation
	Monthly report summarizing: • All direct integrity test results above the control limit and the corrective action that was taken • All 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 72 months after promulgation	Within 10 days following the month in which monitoring was conducted, beginning 102 months after promulgation
Bag Filters (1.0 log) and Cartridge Filters (2.0 log)	Initial demonstration that the following criteria are met: • Process meets the basic definition of bag or cartridge filtration • Removal efficiency established through challenge testing that meets rule criteria • Challenge test shows at least 2 and 3 log removal for bag and cartridge filters, respectively	No later than 72 months after promulgation	No later than 102 months after promulgation
Chlorine Dioxide (log credit based on CT)	Summary of contact time required for inactivation of microbial pathogens (CT values) for each day and log inactivation based on tables in proposed §141.729(b)	Within 10 days following the month in which monitoring was conducted, beginning 72 months after promulgation	Within 10 days following the month in which monitoring was conducted, beginning 102 months after promulgation

Toolbox Option (Potential *Cryptosporidium* Reduction Log Credit)	Systems Must Submit the Following Items to the State	On the Following Schedule[1] (Systems Serving ≥10,000 People)	On the Following Schedule[1] (Systems Serving <10,000 People)
Ozone (log credit based on CT)	Summary of CT values for each day and log inactivation based on tables in proposed §141.729(c)	Within 10 days following the month in which monitoring was conducted, beginning 72 months after promulgation	Within 10 days following the month in which monitoring was conducted, beginning 102 months after promulgation
UV (log credit based on validation and operating within conditions determined during validation)	Results from reactor validation testing demonstrating operating conditions that achieve required UV dose	No later than 72 months after promulgation	No later than 102 months after promulgation
	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 UV dose	Within 10 days following the month in which monitoring was conducted, beginning 72 months after promulgation	Within 10 days following the month in which monitoring was conducted, beginning 102 months after promulgation
Second Stage Filtration	Monthly verification that 100% of flow was filtered through both stages	Within 10 days following the month in which monitoring was conducted, beginning 72 months after promulgation	Within 10 days following the month in which monitoring was conducted, beginning 102 months after promulgation
Slow Sand Filtration	Monthly verification that 100% of flow was filtered through two filtration stages	Within 10 days following the month in which monitoring was conducted, beginning 72 months after promulgation	Within 10 days following the month in which monitoring was conducted, beginning 102 months after promulgation

Toolbox Option (Potential *Cryptosporidium* Reduction Log Credit)	Systems Must Submit the Following Items to the State	On the Following Schedule[1] (Systems Serving ≥10,000 People)	On the Following Schedule[1] (Systems Serving <10,000 People)
Individual Filter Performance (1.0 log)	Monthly verification of the following, based on continuous monitoring of turbidity for each individual filter: • Filtered water turbidity less than 0.1 NTU in at least 95% of the daily maximum values from individual filters (excluding 15 minute period following start up after backwashes) • No individual filter with a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning 72 months after promulgation	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning 102 months after promulgation
Demonstration of Performance	Results from testing following state approved protocol	No later than 72 months after promulgation	No later than 102 months after promulgation
	Monthly verification of operation within state-approved conditions for demonstration of performance credit	Within 10 days following the month in which monitoring was conducted, beginning 72 months after promulgation	Within 10 days following the month in which monitoring was conducted, beginning 102 months after promulgation

[1] States may allow an additional 2 years for systems making capital improvements.

Example System Description - System N

System N is a large Subpart H system serving 35,000 people. It uses a conventional filtration plant and treats its water with chlorine gas.

<u>Example #15 - Toolbox Reporting M&R Violation</u>

System N was placed in bin 2 and, therefore, must provide an additional 1 log of treatment. In order to comply with the additional treatment requirements of the LT2ESWTR, System N decides to use UV for primary disinfection and chlorine for secondary disinfection. It submits a proposal outlining the change to its disinfection practice to the state. The report contains all of the information required in proposed §141.714(a)(6). After receiving approval from the state, System N installs a UV reactor validated according to 141.729(d)(3) and operates within conditions determined during validation in January 1, 200X [insert date 48 months after rule promulgation]. After this initial demonstration, System N submits no further information to the state.

Example #15 Decision

Although System N installed the necessary treatment before January 1, **200X+2 [insert date 72 months of the LT2ESWTR's promulgation**], it has committed an M&R violation. System N is required to submit monthly operational reports to the state summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within the conditions required to receive credit for additional *Cryptosporidium* treatment. System N submits monthly operational reports to the state on June 1, **200X+2.**

Public Notice Requirement

System N must provide Tier 3 public notice of this M&R violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirement

There are no specific system reporting requirements for this violation.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED toolbox reporting M&R violation data elements and DTF transactions for this particular violation are listed below in Table 2-43 for SDWIS Reporting Code **03/LT2E**.

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Table 2-43. Toolbox Components M&R Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	03
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*Day on which report is to be submitted*
C1131	Major Violation Flag	Y *or* N

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	1400111		I	C1103	LT2E		
D1	GA1234579	1400111		I	C1105	03		
D1	GA1234579	1400111		I	C1107	200X0211		
D1	GA1234579	1400111		I	C1109	200X+20601		
D1	GA1234579	1400111		I	C1131	X		

Example System Description - System O

System O is a large Subpart H system serving 65,000 people. It uses a conventional filtration plant.

Example #16 - Toolbox Reporting

In anticipation of the LT2ESWTR, System O underwent a plant-wide optimization program. As a result of this optimization, System O is able to consistently achieve individual filter effluent (IFE) turbidity values that are significantly less than what is required under the IESWTR. While System O is classified as a bin 2 system and must, therefore, provide an additional 1 log of treatment, it relies on these low IFE turbidity values to meet its TT requirements.

Example #16 Decision

System O is in compliance with the M&R requirements of the LT2ESWTR as long as it submits a report to the state within 10 days of the end of the month that verifies that IFE turbidity was less than or equal to 0.1 NTU in at least 95 percent of all IFE measurements taken based on daily maximum measurements (excluding the 15 minute period following filter start-up after backwash) and that no two consecutive IFE turbidity values taken 15 minutes apart exceeded 0.3 NTU. The system must report this information

every month that it claims the 1 log *Cryptosporidium* treatment credit for its IFE performance. Unlike the installation of UV disinfection in the example above, there is no need for System O to make an initial demonstration to the state before it is required to have additional treatment for *Cryptosporidium* operational.

Public Notice Requirement

Because System O is in compliance, no public notice is required.

System Reporting Requirement

System O is required to submit monthly reports to the state on its IFE measurements as outlined in Table 2-21 and described in the discussion above.

Primacy Agency to SDWIS/FED Reporting

Because the system is in compliance, no SDWIS/FED reporting is required.

2.5 Recordkeeping Violations

Recordkeeping violations are reported for water systems failing to maintain *Giardia lamblia* and virus disinfection profiles on file for state review or failingto keep monitoring and bin characterization results for 36 months after source water monitoring has been completed. Table 2-43 presents a summary of all recordkeeping violation reporting codes for the LT2ESWTR.

Table 2-44. SDWIS/FED Codes for Recordkeeping Under the LT2ESWTR

Violation Code	Contaminant Code	Recordkeeping Violation
09	LT2E	Failure to maintain disinfection profiles for *Giardia* and viruses
09	LT2E	Failure to maintain source water monitoring and bin classification (initial or second round)

2.5.1 Type 09/LT2E: Failure to Maintain Disinfection Profiles Recordkeeping Violation

Cross-reference to LT2ESWTR Implementation Guidance:

Section 1, pages 27 and 47

Section 5, pages 120 and 125

Cross-reference to Rule:

Proposed §141.713(d) and §141.731(c)

Table 2-45. Violation Type: 09/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
09	LT2E	Failure to maintain *Giardia* and virus disinfection profiles on file for state review during sanitary surveys

Example System Description - System P

System P is a large Subpart H system serving 41,000 people.

Example #17 - Failure to Maintain Disinfection Profile Recordkeeping Violation

System P created a disinfection profile for *Giardia lamblia* and for viruses under the provisions of the IESWTR. After receiving state approval to use its existing profiles to satisfy the profiling requirements of the LT2ESWTR, System P discards its profiling data on January 1, 200X. It reasoned that because the state had already reviewed the profiles in two sanitary surveys in between the promulgation of the IESWTR and the LT2ESWTR, it no longer needed to retain that information.

Example #17 Decision

System P has committed a recordkeeping violation. Systems must retain their disinfection profiles and the underlying data indefinitely. This requirement is not only to allow states to review the data during sanitary surveys, but if the system ever makes a significant change in disinfection practice, the profiling data will be needed to create a disinfection benchmark. The system obtained copies of their missing data from the state on June 1, 200X.

Public Notice Requirement

As required by Appendix A of Subpart Q, System P must give Tier 3 public notice of this violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirement

There are no system-specific reporting requirements for this violation.

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED failure to maintain disinfection profile recordkeeping violation data elements and DTF transactions are listed below in Table 2-46 for SDWIS Reporting Code 09/LT2E.

Table 2-46. Disinfection Profiles Recordkeeping Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	**LT2E**
C1105	Violation Type Code	**09**
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*Date on which system retains profiles*
C1131	Major Violation Flag	Y *or* N

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	1500111		I	C1103	**LT2E**		
D1	GA1234579	1500111		I	C1105	**09**		
D1	GA1234579	1100111		I	C1107	**200X**0101		
D1	GA1234579	1100111		I	C1109	**200X**0601		
D1	GA1234579	1100111		I	C1131	**X**		

2.5.2 Type 09/LT2E: Failure to Maintain Source Water Monitoring and Bin Classification (initial or second round) Recordkeeping Violation

Cross-reference to LT2ESWTR Implementation Guidance:

Section 1, page 47

Section 5, pages 120 and 125

Cross-reference to Rule:

Proposed §141.731(a)

Table 2-47. Violation Type: 09/LT2E

Violation Code	Contaminant Code	Treatment Technique Violations
09	LT2E	Failure to keep monitoring and bin characterization results for 36 months after the completion of source water

Example System Description - System Q

System Q is a small Subpart H system serving 6,000 people.

Example #18 - Failure to Maintain Source Water Monitoring and Bin Classification Recordkeeping Violation

System Q was required to conduct source water monitoring for *Cryptosporidium*. Based on that monitoring, which the system completed on June 30, 200X, it determines that it is a bin 1 system because its mean *Cryptosporidium* concentration was less than 0.075 oocysts/L. Because it does not have to provide additional treatment for *Cryptosporidium*, System Q discards its source water monitoring results and fails to replace them.

Example #18 Decision

System Q has committed a recordkeeping violation. All Subpart H systems are required to maintain the results of their source water monitoring and their bin classification for at least 36 months after they complete their source water monitoring.

Public Notice Requirement

As required by proposed §141.700, System Q must give Tier 3 public notice of this violation in accordance with the provisions of 40 CFR 141.201.

System Reporting Requirement

There are no system specific reporting requirements for this violation

Primacy Agency to SDWIS/FED Reporting

The appropriate SDWIS/FED failure to maintain source water monitoring and bin classification recordkeeping violation data elements and DTF transactions are listed below in Table 2-48 for SDWIS Reporting Code 09/LT2E.

Table 2-48. Source Water Monitoring and Bin Classification (initial or second round) Recordkeeping Violation Data Element Table and DTF Transactions

Data Elements:

Number	Name	Value or Comment
C0101	PWSID	*Qualifier 1*
C1101	Violation ID	*Qualifier 2*
C1103	Contaminant Code	LT2E
C1105	Violation Type Code	09
C1107	Compliance Period Begin Date	
C1109	Compliance Period End Date	*36 months after system completes source water monitoring*
C1131	Major Violation Flag	Y *or* N

DTF Transactions:

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	
D1	GA1234579	1100111		I	C1103	LT2E		
D1	GA1234579	1100111		I	C1105	09		
D1	GA1234579	1100111		I	C1107	200X0630		
D1	GA1234579	1100111		I	C1109	200X+30630		
D1	GA1234579	1100111		I	C1131	X		

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Section 3

General SDWIS Reporting

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3.1 Federally Reported Violations

Under SDWIS/FED reporting, primacy agencies only report to EPA when violations occur. In the interest of reducing the reporting burden on primacy agencies, EPA has limited the number and type of violations to be reported to SDWIS/FED. However, PWSs must keep records and report all required information to the primacy agency. Any violation of the rule, whether included in Table 2-11a or not, is a basis for a primacy agency or federal enforcement action.

Tables 2-11a and 2-11b in Section 2 of this document provide LT2EWTR specific reporting information and federally reportable violations for the LT2ESWTR. These violations are listed by contaminant and violation type. The tables include the SDWIS/FED reporting codes, the regulatory citation, system type affected, a detailed description of the violation, and the initial compliance date. This table will contribute to a user's understanding of those violations listed in SDWIS.

SDWIS/FED Reporting

The SDWIS/FED reporting requirements apply to systems of all types and sizes. Although the method of determining violations may differ between systems, a particular violation code defines the same type of violation for all systems.

Primacy agencies must report SDWIS/FED data using an XML or DTF format. OGWDW is currently defining its SDWIS XML Schema. Once the Schema is available, this document will be updated to include XML reporting formats. Table 3-1 depicts the format of a DTF transaction.

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Table 3-1. DTF and Transaction Format

1-2	3-11	12-18	19-25	26	27-31	32-71	72-74	75-80
Form ID	Qual 1	Qual 2	Qual 3	DIM Code	DE Number	Data Value	Blank	Batch Sequence Number

Form ID	An identification number that allows input of certain types of data.
Qualifier 1	The PWSID of the water system to be inserted, modified, or deleted.
Qualifier 2	Contains an ID that further defines what record is to be inserted, modified, or deleted. Qualifier 2 contains the SE ID when reporting facilities and treatments, the violation ID when reporting violations, and the enforcement ID when reporting enforcements.
Qualifier 3	Contains an ID that further defines what record is to be inserted, modified, or deleted. Qualifier 3 contains the treatment ID when reporting treatments.
DIM Code	D = Delete I = Insert M = Modify
DE (Data Element) Number	The DTF data element number (e.g., CO483, C1105) identifying a specific element to be inserted, modified, or deleted.
Data Value	The data value associated with the data element number.

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Section 4

Additional Sources of Information

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4.1 SDWIS/FED Resources

SDWIS/Fed Data Entry Instructions (April 2003)
This document provides details for the creation of all parts of DTF transactions. This document is available on the SDWIS/FED Web site: http://www.epa.gov/safewater/sdwisfed/documentation.html.

SDWIS/FED Online Data Dictionary (January 2003)
This application provides details on every table and field contained in SDWIS/FED, including definitions, permitted values, names, and editing requirements. This document is available on the SDWIS/FED Web site: http://www.epa.gov/safewater/sdwisfed/documentation.html.

Actions DTF (November 2002)
Actions DTF was developed to assist state and regional PC users in the creation of a data file containing information on violation or enforcement actions that can be input to the SDWIS/FED System. The software creates records in DTF, which is required to enter data into SDWIS/FED.

Actions DTF is a Microsoft™ (MS) Access® Windows application that can be installed on a personal computer. The software provides data entry capabilities for SDWIS/FED. In order to facilitate input keyed directly from data entry forms, Actions DTF screens mimic the Data Capture Forms used in the *SDWIS/FED Data Entry Instructions*.

4.2 Technical Information Available on the LT2ESWTR

A series of guidance manuals support the LT2ESWTR. The manuals will aid EPA, primacy agencies, and affected PWSs in implementing this rule and will help ensure that implementation among these groups is consistent. The manuals are available on EPA's Web site: http://www.epa.gov/safewater/lt2 and http://www.epa.gov/safewater/mdbp/implement.html. Summaries of the manuals are provided below.

Draft Long Term 2 Enhanced Surface Water Treatment Rule Implementation Guidance (EPA XXX-R-03-XXX)

Objective: To provide guidance to EPA regions and states exercising primary enforcement responsibility under the SDWA concerning how EPA interprets the LT2ESWTR under SDWA. It also provides guidance to the public and the regulated community on how EPA intends to exercise its discretion in implementing the statute and regulations. The guidance is designed to implement national policy regarding the LT2ESWTR.

Contents: The guidance manual includes four sections, discussing rule requirements, SDWIS reporting, and significant noncompliance, State Primacy Revision Applications, and other supporting information. It includes six appendices, including a Primacy Revision Crosswalk, Sample Primacy Revision Application Extension Agreement, guidance on audit law issues, a LT2ESWTR plain English summary, a copy of the LT2ESWTR language, and sample LT2ESWTR monitoring forms.

Draft Source Water Monitoring Guidance Manual for Public Water Systems for the Long Term 2 Enhanced Surface Water Treatment Rule (EPA 815-D-03-005, June 2003)

Objective: To provide guidance to EPA regions and states exercising primary enforcement responsibility under SDWA concerning how EPA interprets the LT2ESWTR under SDWA. It also provides guidance to the public and the regulated community on how EPA intends to exercise its discretion in implementing the statute and regulations. The guidance is designed to implement national policy regarding the LT2ESWTR.

Contents: The guidance manual discusses laboratory contracting for *Cryptosporidium*, sample collection procedures for *Cryptosporidium* and *E. coli*, and data evaluation and interpretation advice. The manual also provides guidance on submitting historical data ("grandfathering").

Draft Microbial Laboratory Manual for the Long Term 2 Enhanced Surface Water Treatment Rule (EPA 815-D-03-006, June 2003)

Objective: To provide guidance to laboratories on procedures for analyzing *Cryptosporidium* and *E. coli* samples under the LT2ESWTR in order to ensure compliance and maximize data quality and consistency.

Contents: The guidance manual discusses various sample analysis requirements (including revised methods for analyzing *Cryptosporidium* samples), laboratory certification program, quality assurance programs, quality control analytical methods, sample collection and processing procedures, recordkeeping, calculations for Method 1622/1623, data recording and reporting, data archiving, and equipment and supplies. The appendices provide sample report forms, checklists, summaries of various methods, and an EPA Method 1622/1623 Bench Sheet.

Draft Ultraviolet Disinfection Guidance Manual (EPA 815-D-03-007, June 2003)

Objective: Provides guidance on the selection, design, and operation of ultraviolet disinfection to comply with treatment requirements under the rule.

Contents: The guidance manual provides an overview of UV disinfection and validation testing as well as information on planning, designing, start-up, and operation of UV installations. The manual also discusses issues for various types of systems and provides a regulatory timeline and sample compliance forms. The Excel *Ultraviolet Disinfection Guidance Manual Workbook* supplements the manual with spreadsheet calculations used in validating a UV reactor.

Draft Membrane Filtration Guidance Manual (EPA 815-D-03-008, June 2003)

Objective: Provides guidance on the selection, design, and operation of membrane filtration to comply with treatment requirements under the rule.

Contents: The guidance manual presents an overview of membrane filtration and describes requirements and recommendations for challenge testing, direct integrity testing, continuous indirect integrity monitoring, pilot testing, implementation considerations, and initial start-up procedures.

Draft Long Term 2 Enhanced Surface Water Treatment Rule Toolbox Guidance Manual (EPA 815-D-03-009, June 2003)

Objective: Provides guidance on the selection, design, and operation of treatment and management strategies in the LT2ESWTR "microbial toolbox" to comply with treatment requirements under the rule.

Contents: The guidance manual discusses each of the technologies included in the LT2ESWTR toolbox, including watershed control programs, alternative sources, bank filtration, presedimentation, lime softening, combined and individual filter performance, bag and cartridge filters, second stage filtration, chlorine dioxide, ozone, demonstration of performance, UV light, and membrane filtration. There is also information on site specific determination of contact time for chlorine dioxide and ozone, ozone CT methods, measuring ozone residual, derivation of extended continuous stirred tank reactor equations, and watershed control best management practices.

Draft Guidance on Generation and Submission of Grandfathered Cryptosporidium Data for Bin Classification Under the Long Term 2 Enhanced Surface Water Treatment Rule (EPA 815-R-03-009, April 2003)

Objective: Provides guidance on how PWSs can perform grandfathered *Cryptosporidium* monitoring such that the results are equivalent to data generated under the LT2ESWTR and, therefore, acceptable for use in bin classification.

Contents: The guidance manual presents general guidelines for generating and reporting *Cryptosporidium* data and provides checklists for grandfathering *Cryptosporidium* data.

Guidelines Establishing Test Procedures for the Analysis of Pollutants; Analytical Methods for Biological Pollutants in Ambient Water (68 FR 43272, July 2003)

Objective: To provide guidance to EPA regions and states exercising primary enforcement responsibility under the SDWA concerning E. coli density in source water. The document identifies EPA-approved test methods for *E. coli*, enterococci, *Cryptosporidium*, and *Giardia* for ambient fresh water quality monitoring. EPA intends for this rule to also satisfy requests from governments, regulated entities, and environmental laboratories that EPA publish analytical test procedures that were evaluated through interlaboratory validation for enumerating *E. coli*, enterococci, *Cryptosporidium*, and *Giardia* in ambient waters.

Contents: The document includes a list of approved biological methods for ambient water quality analysis and references for those methods. Also included is a table summarizing required containers, preservation techniques, and holding times for proper sampling and processing.

Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources (Published by American Water Works Association, Denver, CO, USEPA, March 1991)

Objective: To provide guidance to EPA regions and states exercising primary enforcement responsibility under the SDWA concerning how EPA interprets filtration and disinfection requirements under SDWA. It also provides guidance to the public and the regulated community on how EPA intends to exercise its discretion in implementing the statute and regulations. The guidance is designed to implement national policy regarding surface water sources.

Contents: The guidance manual summarizes how to meet the requirements of the SWTR, including guidance for systems that do and do not meet filtration avoidance requirements, schedules for rule requirements, information on public notification, and eligibility requirements for exemptions.

Uncovered Finished Water Reservoirs Guidance Manual (EPA 815-R-99-011, April 1999)

Objective: To provide guidance to PWSs who are required to cover or treat the discharge from their uncovered finished water reservoirs to be in compliance with LT2ESWTR requirements.

Contents: The guidance manual describes finished water reservoir management plans, sources of contamination and associated control measures, how to mitigate water quality degradation, and issues related to water quality monitoring. The manual also presents studies of finished water reservoirs in various states.

Disinfection Profiling and Benchmarking Guidance Manual (EPA 815-R-99-013, August 1999)

Objective: To provide guidance to help PWSs in implementing the practice of disinfection profiling and benchmarking, as required under the IESWTR.

Contents: The guidance manual describes the profile of the applicability of the profiling and benchmarking provisions to PWSs and details the procedures for generating a disinfection profile and calculating the disinfection benchmark. The manual will also help PWSs determine what constitutes a "significant change" to disinfection practices, communicate with the state, and use the disinfection benchmark to modify disinfection practices.

4.3 Other Information Sources

Public Notice Handbook (EPA 816-R-00-010, June 2000)

Objective: To assist water systems in implementing the revised PN Rule published in the *Federal Register* on May 4, 2000, (65 *FR* 25981). The handbook's purpose is to explain EPA's revised public notification rule and provide specific examples of public notices.

Contents: The manual provides a summary of the public notice requirements and provides detailed examples and explanations of Tier 1, 2, and 3 notice. Templates are provided for specific public notification releases and to address the special needs of noncommunity systems.

Final Implementation Guidance for the Public Notification Rule (EPA 816-R-01-010, October 2001)

Objective: To assist states in applying for primacy revision for the PN Rule.

Contents: Information on the primacy revision process—the procedures, timeframes, and content for submission of state primacy revision applications—are outlined in the document. The document also includes the Draft Final Version of SDWIS Reporting in the document's Appendix C.

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Appendix E

Flowcharts

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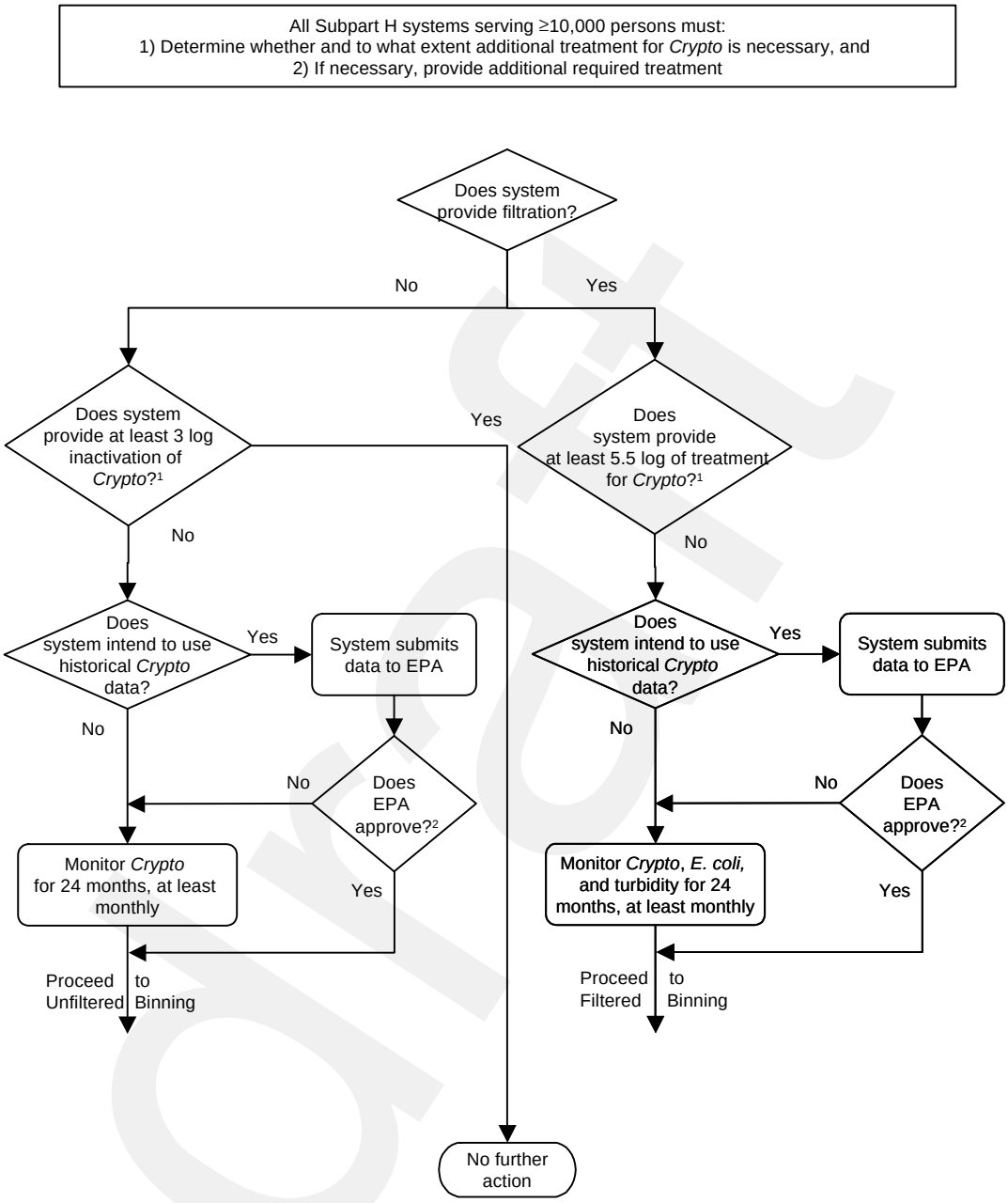
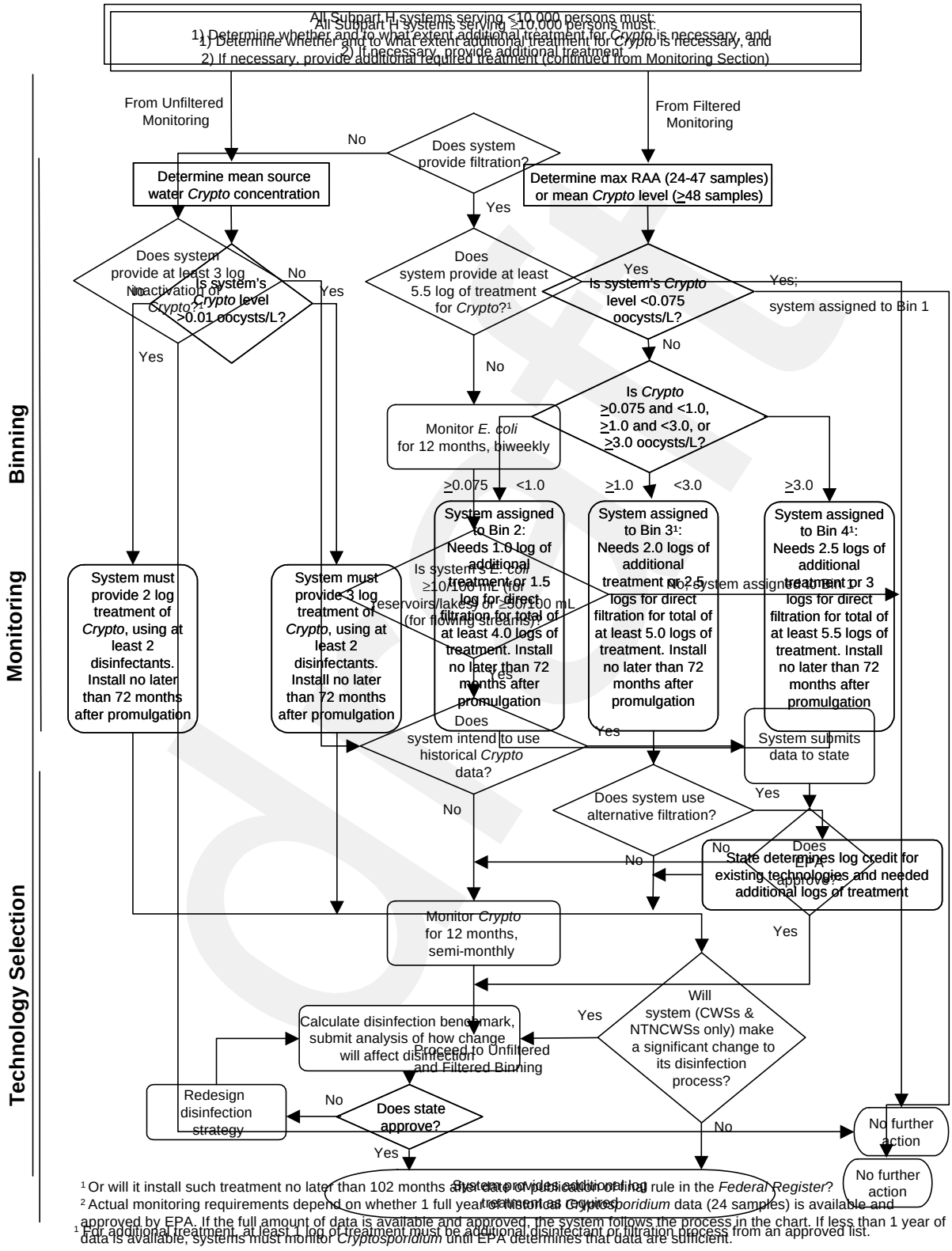


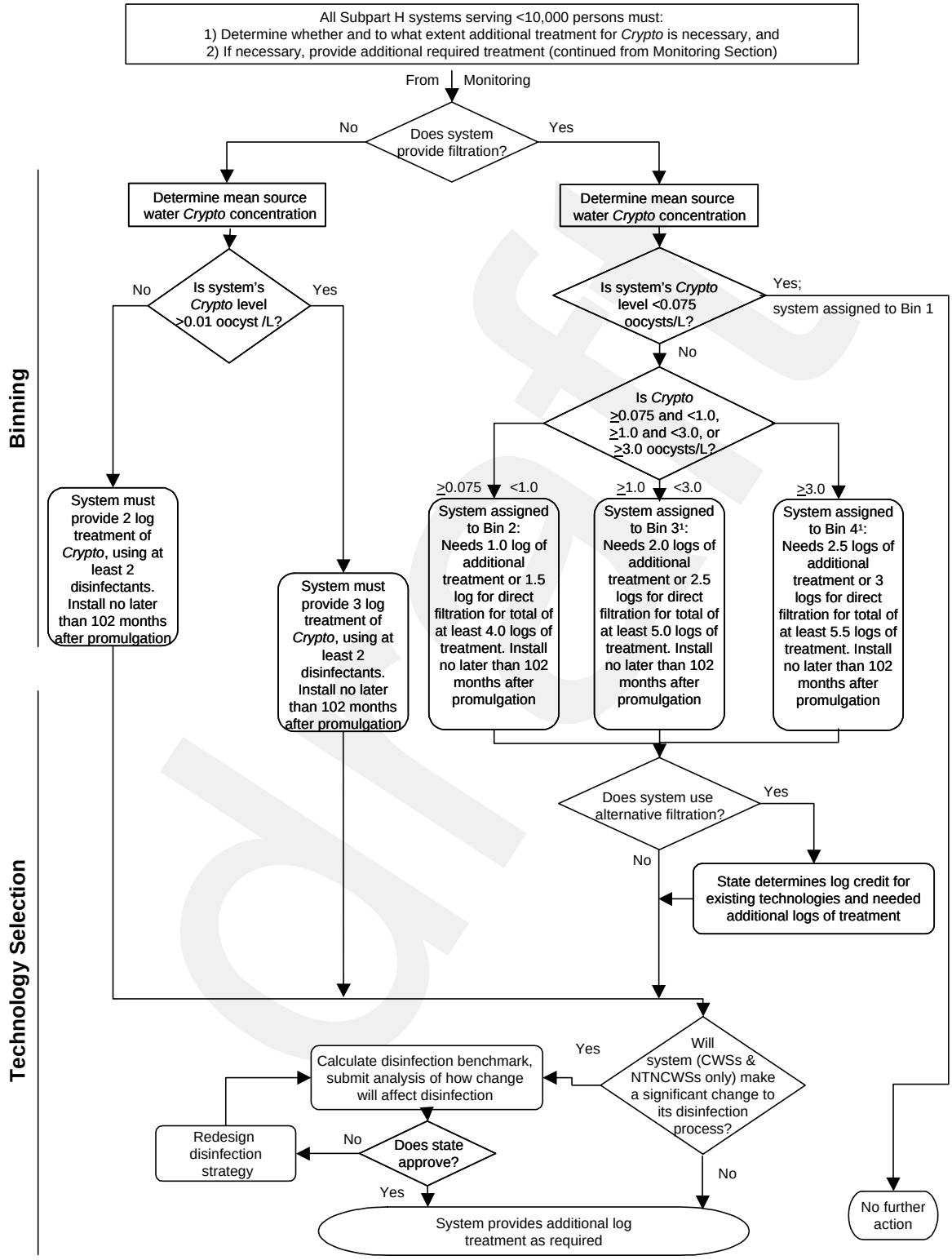
[1] Or will it install such treatment no later than 72 months after date of publication of final rule in the *Federal Register*?
[2] Actual monitoring requirements depend on whether 2 full years of historical *Cryptosporidium* data are available and approved by EPA. If 2 years of data are available and approved, the system follows the process in the flow chart. If less than 2 years of data are available, systems must monitor *Cryptosporidium*, *E. coli*, and turbidity until EPA determines that the new and historical data, when combined, are sufficient.



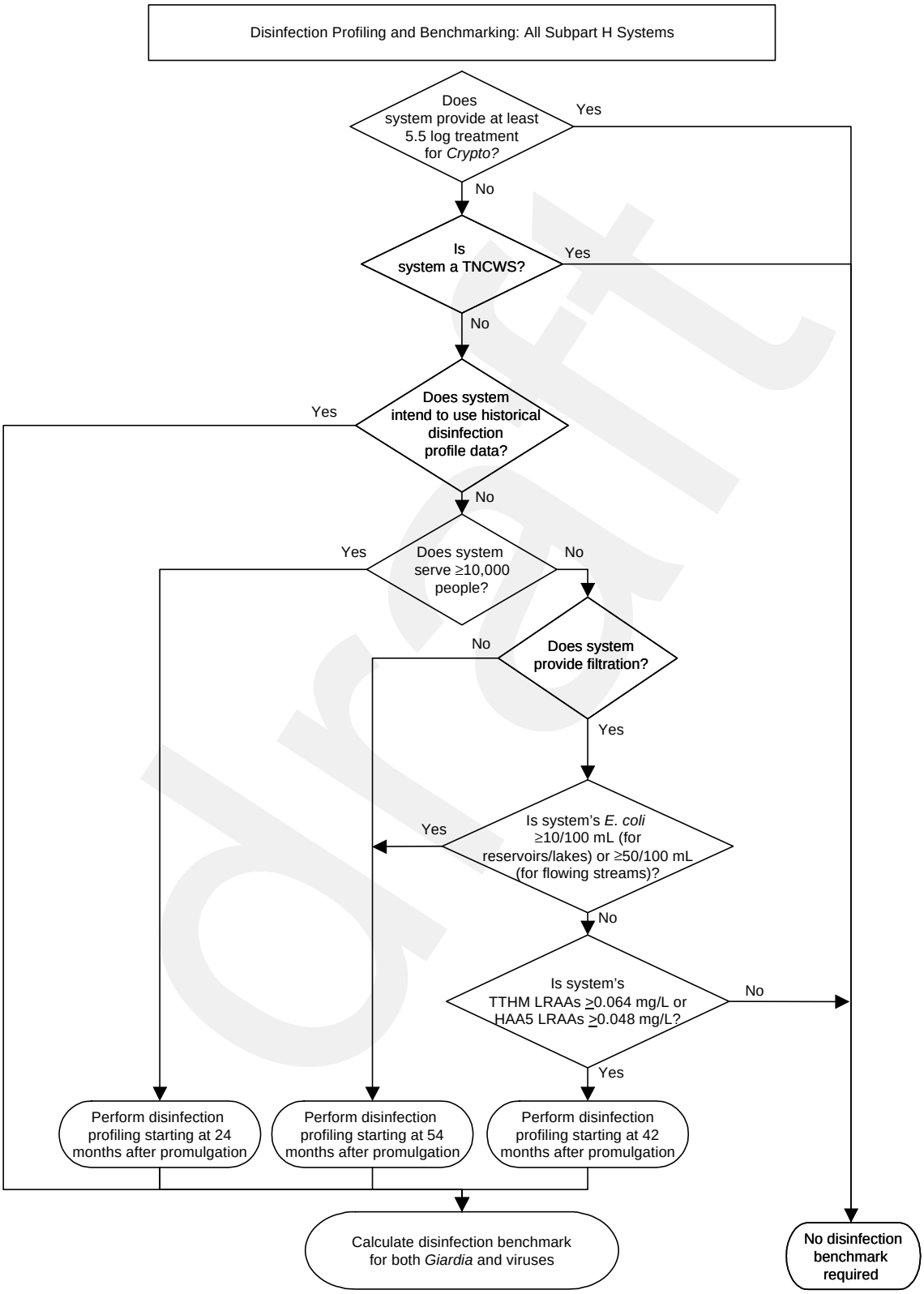
[1] Or will it install such treatment no later than 102 months after date of publication of final rule in the *Federal Register*?

[2] Actual monitoring requirements depend on whether 1 full year of historical *Cryptosporidium* data (24 samples) is available and approved by EPA. If the full amount of data is available and approved, the system follows the process in the chart. If less than 1 year of data is available, systems must monitor *Cryptosporidium* until EPA determines that data are sufficient.

[1] For additional treatment, at least 1 log of treatment must be additional disinfectant or filtration process from an approved list.



[1] For additional treatment, at least 1 log of treatment must be additional disinfectant or filtration process from an approved list.


Disinfection Profiling and Benchmarking: All Subpart H Systems
Does system provide at least 5.5 log treatment for *Crypto?*
Yes
No
Is system a TNCWS?
Yes
No
Does system intend to use historical disinfection profile data?
Yes
No
Does system serve ≥10,000 people?
Yes
No
Does system provide filtration?
No
Yes
Is system's *E. coli* ≥10/100 mL (for reservoirs/lakes) or ≥50/100 mL (for flowing streams)?
Yes
No
Is system's TTHM LRAAs ≥0.064 mg/L or HAA5 LRAAs ≥0.048 mg/L?
No
Yes
Perform disinfection profiling starting at 24 months after promulgation
Perform disinfection profiling starting at 54 months after promulgation
Perform disinfection profiling starting at 42 months after promulgation
Calculate disinfection benchmark for both *Giardia* and viruses
No disinfection benchmark required