

DATE: March 1, 2006; Revised February 11, 2008

TO: Office of Drinking Water Staff

THROUGH: J. Wesley Kleene, Ph.D., P.E., Director
Office of Drinking Water

FROM: John I. Capito, P.E., Chairman
M/DBP Rule Team

SUBJECT: Water – Surveillance & Regulations – Long Term 2 Enhanced Surface Water
Treatment Rule – Source Water Monitoring and Monitoring Plans

Revision Highlights:

- Provision of guidance on how to handle source water monitoring requirements for unfiltered waterworks that are moving towards the installation of filtration as required by VDH regulations.
- Clarification of time accounting and activity tracking requirements.
- Provision of guidance on how to handle waterworks with growing populations, new water sources, or new water plants.
- Clarifications to monitoring requirements for filtered systems serving < 10,000 persons.
- Clarification of lab certification for E. coli enumeration.

SUMMARY STATEMENT:

This memo summarizes the requirements for source water monitoring, as prescribed in the Long Term 2 Enhanced Surface Water Treatment Rule (LT2), published in the Federal Register on January 5, 2006, and became effective on March 6, 2006, and the monitoring plans necessary to implement such monitoring.

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BACKGROUND:

The requirements of LT2 apply to all waterworks using surface water or groundwater under the direct influence (GWUDI) of surface water. All applicable waterworks must conduct both an initial and a second round of source water monitoring for each plant that treats a surface water or GWUDI. The monitoring may include *Cryptosporidium*, *E. coli*, and turbidity. The results of the monitoring will determine the level, if any, of additional *Cryptosporidium* treatment that must be provided. This memo covers only the initial round of monitoring and monitoring plan requirements.

The following definitions apply to the implementation of this Rule:

- Combined distribution system (CDS) – the interconnected distribution system consisting of wholesale waterworks and of the consecutive waterworks that receive finished water.
- Consecutive system – a public distribution system that receives some or all of its finished water from one or more wholesale waterworks. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

Wholesaling waterworks must perform their source water monitoring based on the schedule dates using the population of the largest waterworks in the CDS.

INITIAL SOURCE WATER MONITORING REQUIREMENT [§ 141.701 (A)]:

1. Filtered waterworks serving $\geq 10,000$ persons must sample for *Cryptosporidium*, *E. coli*, and turbidity in their source water at least monthly for 24 months.
2. Filtered waterworks serving $< 10,000$ persons must sample for *E. coli* at least once every two weeks for 12 months. However, these waterworks may elect to monitor for *Cryptosporidium* instead. If the waterworks elects to monitor for *Cryptosporidium*, they must notify us at the time they submit their monitoring schedule.

Note: Waterworks may sample more frequently than required if the sampling frequency is evenly spaced throughout the monitoring period.

UNFILTERED SURFACE WATER OR GROUNDWATER UNDER THE DIRECT INFLUENCE OF SURFACE WATER:

The original Surface Water Treatment Rule (effective December 31, 1990) addresses unfiltered surface waters and unfiltered ground waters under the direct influence of surface water (GWUDI), establishing criteria for allowing such waters to avoid filtration. Virginia determined that it would not allow unfiltered surface or GWUDI sources, and that all surface or GWUDI waters would require appropriate filtration and disinfection (12 VAC 5-590-420-A and -B-2). In those cases where VDH has identified a surface or GWUDI water source, and the waterworks owner is moving (under the terms of an Executed Order) towards the installation of filtration and disinfection, such a waterworks will conduct and report Source Water Monitoring based on its assigned Schedule (1, 2, 3, or 4, based on service population) as a filtered waterworks.

SOURCE WATER MONITORING PLANS

LT2 requires the submission of a sampling schedule and the sampling locations (details below). VDH will require this information, along with other pertinent information, to be submitted in the form of a Source Water Monitoring plan, in paper format. Waterworks must submit three copies of the Source Water Monitoring plan for review. The Field Office will return one copy of the approved plan to the waterworks, will forward a copy of the approved plan to IPMC, and will retain the third copy in the Field Office files.

SAMPLING SCHEDULE [§ 141.702]

1. Waterworks required to conduct source water monitoring must submit a sampling schedule that specifies the actual calendar dates when the system will collect each sample. The schedule is due no later than three months prior to the required start date for sampling.
2. Waterworks must submit their schedule in written (paper) format to VDH for review. § 141.702(a)(2)(i) requires all waterworks serving more than 10,000 people to submit their LT2 monitoring plan to EPA electronically. We will advise Virginia's waterworks to use the alternative approach listed in § 141.702(a)(2)(ii) to allow them to submit through ODW. Under this alternative approach we will approve these plans, as well as all the rest of the plans for Virginia's waterworks, and forward the approval letters and documentation to IPMC for data entry.
3. VDH will review the proposed schedule and approve it no later than 30 days prior to the scheduled start of monitoring. (According to LT2, if we take no action on the schedule the waterworks must begin sampling on the schedule submitted.)
4. Our approval letter with copies of the approved schedule will be sent to the owner. A copy of the approval letter and schedule will be sent to IPMC in order to update the LT2 data base. The waterworks will not be entering this data directly into EPA's database.

SAMPLING LOCATIONS [§ 141.703]

A detailed description of the proposed sampling location(s) must be submitted at the same time as the proposed sampling schedule. VDH will review the proposed sampling location(s) along with the schedule, and comment on/approve at the same time. The following guidelines are to be used in evaluating the sample location:

1. Each water plant must monitor separately, except where multiple plants draw water from the same influent pipeline or intake. In such case a representative sample for all of the plants may be used.
2. Samples are to be collected prior to any chemical treatment, unless VDH makes a specific determination that:
 - a. sampling prior to chemical treatment is not feasible; and
 - b. the chemical treatment will not have any adverse impact on analysis of the sample.
3. If a waterworks practices recycle of the filter backwash, all samples must be collected prior to the point of any filter backwash water addition.

4. Plants with multiple water sources which include multiple surface water sources and blended surface water and ground water sources must use the following criteria:
 - a. The use of multiple sources during monitoring must be consistent with routine operational practice.
 - b. Must use a sample tap where the sources are combined prior to treatment, if available.
 - c. If a combined sample tap is not available then samples must be collected at each source intake on the same day and must either:
 - i. Composite the samples into one sample prior to analysis. (This composite must be flow weighted based on the proportion of the source in the total plant flow at the time the sample was collected.), or
 - ii. Analyze each sample 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.

Appendix A-1 provides a letter which may be used for approving the proposed sampling schedule and locations. Appendix A-2 provides a review form for evaluating the proposed schedule and locations.

ANALYTICAL REQUIREMENTS [§§ 141.704 AND 141.705]

Laboratories which perform the analytical work required for the source water monitoring must use the proper test methods and must have received the appropriate approvals/certifications. Laboratories performing *Cryptosporidium* analyses must be found on EPA's list of "Approved Laboratories" (note that EPA is not yet certifying laboratories for *Cryptosporidium* analysis), found on the internet at http://www.epa.gov/OGWDW/disinfection/lt2/lab_home.html#listapprovedlabs, and must use either Method 1622 or Method 1623. Samples collected beginning in 2006 must be analyzed via the most recently approved method, while grandfathered samples must have been analyzed by the method approved at the time (but no earlier than January 1999 the initial methods were approved by EPA). Laboratories performing *E. coli* analyses must be certified by either DCLS (for laboratories located within Virginia) or another certifying agency such as EPA, the National Environmental Laboratory Accreditation Conference, or another State's certifying authority (for laboratories located outside Virginia). The certification must be for an *E. coli* enumeration method (presence/absence is not acceptable). Turbidity measurements must be made by a party approved by VDH (typically, the water plant lab itself).

SCHEDULE FOR PERFORMING INITIAL MONITORING [§ 141.701 I]

Waterworks must submit the proposed sampling schedule and location(s), and begin monitoring, in accordance with the following dates:

WATERWORKS SERVICE POPULATION	WATERWORKS MUST SUBMIT SOURCE WATER MONITORING PLAN TO VDH BY	WATERWORKS MUST BEGIN SOURCE WATER MONITORING NO LATER THAN THE MONTH BEGINNING
≥ 100,000 (Schedule 1)	July 1, 2006	October 1, 2006
50,000-99,999 (Schedule 2)	January 1, 2007	April 1, 2007
10,000-49,999 (Schedule 3)	January 1, 2008	April 1, 2008
< 10,000 and monitor for <i>E. coli</i> ¹ (Sch. 4)	July 1, 2008	October 1, 2008
< 10,000 and monitor for <i>Cryptosporidium</i> ² (Sch. 4)	January 1, 2010	April 1, 2010

¹Applies only to waterworks which have filters.

²Applies to filtered waterworks which elect to monitor for *Cryptosporidium* instead of *E. coli*.

VDH has chosen the date of April 1, 2006, for the determination date for waterworks population (i.e., the population on that date determines the due date for a waterwork's Source Water Monitoring Plan, even if a waterworks' population grows later.)

NOTE: A waterworks that is part of a Combined Distribution System will meet the deadlines determined by the largest waterworks in the CDS, regardless of the individual population of that waterworks.

WATERWORKS NOT PERFORMING SOURCE WATER MONITORING:

There are only two ways for a waterworks to avoid conducting the required source water monitoring. They are as follows:

1. A waterworks may avoid source water monitoring by electing to provide full treatment for *Cryptosporidium*. Filtered systems will be required to provide at least 5.5-log treatment, meeting the Bin 4 requirements specified in § 141.711. Any waterworks choosing to provide treatment instead of performing source water monitoring must notify VDH in writing of such intent no later than the date established for submission of the monitoring plan.
2. A waterworks may use monitoring data collected prior to the start date of the required monitoring. The waterworks must notify VDH in writing of the intent to "grandfather" such data no later than the date the sampling schedule is due. Technically, LT2 only requires that a waterworks submit a notification letter of such intent. However, EPA's intention and VDH's policy is that the waterworks must submit a notification package that provides sufficient information for VDH to be assured that the samples were collected and analyzed in a manner that meets the requirements of LT2. This "enhanced notification" package is to provide essentially the same information as would be required in an initial source water monitoring plan. The "intent to grandfather" notification must be submitted no later than the date that the initial source water monitoring plan is due. All grandfathered data must meet the analysis criteria of LT2, and will be allowed to substitute on a month-for-month basis. If the grandfathered data does not cover the full number of months (24 or 12), or any data which is rejected as not meeting the analysis criteria, additional samples must be collected in accordance with LT2, such that the full number of required months (24 or

12) are monitored. Grandfathered data must be submitted no later than two months after the date that monitoring would have begun (i.e., Schedule 1 systems must submit data to be grandfathered by December 1, 2006). Appendix B-1 provides a letter which may be used in approving the waterworks "intent to grandfather data" package. Appendix B-2 provides a review form for evaluating the "intent to grandfather" package. Review of the actual grandfathered data will be addressed in a separate Working Memo. .

PUBLIC NOTIFICATION AND CCR REQUIREMENTS

Failure to submit a Source Water Monitoring plan (sampling schedule and locations) by the required deadline is classified as a Tier 3 monitoring/reporting violation. Field Offices will follow standard procedures in issuing appropriate NOVs and requiring PN. Discussion of any such violation is to be included in the annual CCR. Information on wordage to be used may be found in EPA's "Long Term 2 Enhanced Surface Water Treatment Rule Implementation Guidance" manual ("issued for comment" draft, June 2006). A copy may be found on the OWDSHare drive at Y:\02-Committees\202-Rule Teams\MDBP & ESWT Rules\Stage 2 and LT2 Rules\Guidance Manuals\LT2 State Implementation Guidance.

TIME ACCOUNTING AND TRACKING

All "Intent to Grandfather Data" packages and Source Water Monitoring Plans are to be entered to PT Log as SDWA Reports. Time spent reviewing these items is to be charged to SDWA Reports. The date of the "Intent to Grandfather" approval letter or the Source Water Monitoring plan approval letter is to be entered to R&R (System Information button, Dates tab).

NEW WATER SOURCES

LT2 states that a waterworks that begins to use a new water source after the date that the waterworks is begin monitoring (based on the schedule shown in the table on page 4) is to monitor that new source a schedule approved by the State [§141.701(f)]. VDH will also set, in consultation with the waterworks, the monitoring schedule for any new water plant that starts operation after the appropriate date in the table. Based on guidance provided by EPA in the MDBP Q&A Database, consideration may be given to allowing the use of existing Cryptosporidium data for a new water plant that will utilize a raw water source that has already seen source water monitoring. VDH will make that determination on a case-by-case basis.

APPROVAL LETTERS:

Copies of the final letters (Appendix A-1 and B-1) must be sent to:

LT2ESWTR and STAGE 2 DBPR
US EPA-IPMC
P O Box 98
Dayton, OH 45401-0098

END OF MEMO

Appendix A-1 – Approval Letter LT-2 Plan

Date

SUBJECT: (City or County)
Water - (System Name)
PWSID No. _____

Waterworks Owner Name
Address 1
Address 2
City/Town, VA ZIP Code

Dear _____:

We have received your proposed Long Term 2 Enhanced Surface Water Treatment Rule Source Water Monitoring Plan dated _____. This is to advise that the proposed monitoring schedule and sampling location(s) have been found by the Virginia Department of Health to meet the requirements of §§ 141.702 and 703 of the National Primary Drinking Water Regulations, and are hereby provisionally approved.

Please remember that all samples must be collected per the approved schedule (no more than 2 days before or 2 days after the scheduled date), and must be analyzed by a laboratory which has been approved by EPA for the specific analysis. The laboratory must report the results electronically to EPA. You will have the opportunity to review the data once it is posted on EPA's web tool. In addition, VDH requires that you or your lab provide these results to VDH in paper format following your review, so that VDH can review the data.

(Use this paragraph instead, for filtered systems <10,000 doing *E. coli* monitoring) Please remember that all samples must be collected per the approved schedule (no more than 2 days before or 2 days after the scheduled date), and must be analyzed by a laboratory which has been certified for *E. coli* enumeration. The laboratory must report the results directly to this office, in paper format, no later than 10 days after the end of the month that the sample was collected. 

Enclosed is a copy of the monitoring plan, stamped provisionally approved.

If you have any questions on this, please do not hesitate to call _____, District Engineer, of this office.

Sincerely,

Name
Engineering Field Director

Enclosure: Approved monitoring plan

cc: VDH – Central Office – ATTN: Steve Pellei
----- Health Department
cc/enc: U.S. EPA – Information Processing and Management Center

APPENDIX A-2 – LT2 PLAN REVIEW SHEET
LT2 Source Water Monitoring Plan Review Sheet

City / County _____
 Waterworks _____
 PWSID # _____ Plant _____
 Part of a CDS Yes No
 Reviewed By: _____
 Total time spent: _____

	Date
SWM Plan Received	
Review Started	
Modifications Requested	
Revisions Received	
Approved	

I. GENERAL		
Population served	_____ Persons	
Waterworks schedule	Schedule _____	
Is system on this schedule because of being part of a CDS?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Required date for plan submission	Date due _____	
Plan received by due date	<input type="checkbox"/> Yes <input type="checkbox"/> No	
II. MONITORING REQUIREMENTS		COMMENT
No. of months of monitoring required	<input type="checkbox"/> 24 <input type="checkbox"/> 12	
Sufficient no. of months scheduled	<input type="checkbox"/> Yes <input type="checkbox"/> No	
At least one sample per month provided (every two weeks for Schedule 4 doing <i>E. coli</i>)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Monitor for: Cryptosporidium <i>E. coli</i> turbidity	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
Actual sample dates specified	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Plan addresses monitoring windows	<input type="checkbox"/> Yes <input type="checkbox"/> No	
III. ANALYTICAL REQUIREMENTS		COMMENT
<i>Cryptosporidium</i>		
EPA-approved lab	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Method identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> 1622 <input type="checkbox"/> 1623
Filtered on-site	<input type="checkbox"/> Yes <input type="checkbox"/> No	Type: _____
Full sample shipped	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Plan addresses matrix spike samples	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sampling procedures discussed	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<i>E. coli</i>		
Lab identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Exact analytical method identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Lab certified for <i>E. coli</i> enumeration?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Turbidity		
Lab identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Method identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Lab acceptable to VDH for that method	<input type="checkbox"/> Yes <input type="checkbox"/> No	
IV. SAMPLING LOCATION(S)		COMMENT
Does plant have more than one source	<input type="checkbox"/> Yes <input type="checkbox"/> No	
If yes, are flows combined at a point prior to sample collections	<input type="checkbox"/> Yes <input type="checkbox"/> No	
If no, how will plant sample	<input type="checkbox"/> Flow-weighted composite samples <input type="checkbox"/> Flow-weighted averaged results	
Discuss sample location(s)		
Schematic(s) of sample location(s) provided	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Schematic show appropriate sample locations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Will plant monitor prior to the addition of any chemicals	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Will plant monitor prior to the addition of filter backwash water recycle	<input type="checkbox"/> Yes <input type="checkbox"/> No	
If answer to either of last two questions is "no", discuss:		

General comments & discussion:

DETERMINATION:

Source Water Monitoring Plan IS IS NOT acceptable.

Date Review Completed: _____

APPENDIX B-1 – APPROVAL LETTER GRANDFATHERED DATA

SUBJECT: _____ *City/County* _____
Water - _____ *waterworks name* _____
PWSID No. _____

_____ *Waterworks Owner/Contact* _____
Address 1 _____
Address 2 _____
City, State ZIP

Dear _____:

We have received your submittal dated _____, notifying us of the waterworks' intent to submit grandfathered *Cryptosporidium* data to satisfy the requirement of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2) for source water monitoring. The data will be used for the _____ water treatment plant(s).

The submittal provides background information on the waterworks' sampling efforts, including the laboratory(ies) used, sampling locations and schedule, laboratory coordination, matrix spikes, method used for *Cryptosporidium*, sample volume, and other analytical measurements collected. The information presented appears satisfactory to meet the LT2 requirements for grandfathering of *Cryptosporidium* data, as established at § 141.707.

We look forward to receiving the package of grandfathered data for review. Please note that the deadline for submission of the grandfathered data is _____. I would encourage you to review Section 5 of EPA's *Source Water Monitoring Guidance Manual* (February 2006) for details of what must be submitted as part of the data package. The manual may be downloaded from EPA's website, at:

http://www.epa.gov/OGWDW/disinfection/lt2/pdfs/guide_lt2_swmonitoringguidance.pdf

--OR--

We have also received your grandfathered data package. We will review that data for acceptability, and advise you at a later date.

If you have any questions on this the above, please do not hesitate to call contact _____, District Engineer in this office for your area, at the number in the letterhead.

Sincerely,

_____, P.E.
Engineering Field Director

XXX/yyy

pc: V.D.H. – Office of Drinking Water (Attn: Steve Pellei, P.E.)
_____ Health Department
US EPA – Information Processing and Management Center

APPENDIX B-2 – REVIEW INTENT TO GRANDFATHER
Review Sheet – LT2 Intent to Grandfather *Crypto* Data

City / County _____
Waterworks _____
PWSID # _____ Plant _____
Reviewed By: _____
Total time spent: _____

	Date
"Intent" statement Received	
Review Started	
Clarifications Requested	
Clarifications Received	
Approved	

I. GENERAL		
Population served	_____ Persons	
Waterworks schedule	Schedule _____	
Is system on this schedule because of being part of a CDS?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Required date for submission of statement	Date due _____	
Statement received by due date	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Cover letter provided, with background information	<input type="checkbox"/> Yes <input type="checkbox"/> No	
II. SPECIFIC ITEMS ADDRESSED		COMMENT
<i>Cryptosporidium</i> lab qualifications		
Lab identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Lab on EPA approved list	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sampling Location		
Sample location identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Samples collected prior to the addition of any chemicals	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Samples collected prior to the addition of filter backwash water recycle	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Schedule		
Samples collected on regular schedule	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Samples collected at least monthly	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Adequate number of samples collected	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Actual number	_____	
Lab Coordination		
Schedule developed in coordination with lab, to avoid sample rejections	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Matrix Spikes		
Schedule included matrix spikes at 1 st and 20 th samples, etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Method identified		
Used either Method 1622 or 1623	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample volumes of at least 10 L for both monitoring and matrix spike samples	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<i>E. coli</i> and turbidity lab qualifications #		
<i>E. coli</i> lab certified appropriately	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<i>E. coli</i> & turbidity samples collected for each monitoring sample	<input type="checkbox"/> Yes <input type="checkbox"/> No	

E. coli and turbidity data are not required for grandfathered *Cryptosporidium* data to be accepted.

General comments & discussion:

DETERMINATION:

Intent to Grandfather IS IS NOT acceptable.

Date Review Completed: _____