

Pipeline

Special edition: Implementing the newest EPA drinking water rules in Oregon

The Drinking Water Program has applied to the U.S. Environmental Protection Agency (EPA) for primacy for the newest federal rules: the Ground Water Rule, the Stage 2 Disinfection Byproducts Rule, and the Long Term 2 Enhanced Surface Water Treatment Rule. While EPA reviews Oregon’s primacy applications, Oregon has interim primacy, which means that the Drinking Water Program may take over the rule implementation work that EPA began several years ago.

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Implementation of the Ground Water Rule in Oregon

by James Nusrala

While certain provisions in the new federal Ground Water Rule (GWR) are explicit, such as requiring a source sample after a routine positive coliform sample, the Drinking Water Program (DWP) is allowed discretion in how certain elements of the rule will be implemented in Oregon. These implementation issues are not addressed in the administrative rules, but rather through policy decisions as outlined below.

- 1. Extending the 24-hour time limit to collect triggered source water samples after a routine positive:** The DWP may consider allowing more than 24 hours for sample collection based on the following.
 - **Lab availability:** If the original positive came back at the end of the week, on Friday for example, and the lab is closed for the weekend, the water system has until the next working day to collect a follow-up sample and deliver it to the lab. For this reason, we always recommend collecting routine coliform samples on a Monday or Tuesday.

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Oregon program staff and EPA Region X staff are working now to develop a plan for the orderly transition to Oregon primacy. Meanwhile, the three newest EPA rules specify a variety of requirements and deadlines for public water suppliers to meet. We therefore present this special edition of the *Pipeline*, entirely dedicated to topics related to the newest rules and their implementation in Oregon. We hope that you find it useful.

Dave Leland is manager of the Drinking Water Program / 971-673-0415 or david.e.leland@state.or.us



- **Intermittent transport options to a certified lab:** A sample must arrive at a certified lab within 30 hours of collection to be valid. In some rural areas, the operator may need to wait to collect a triggered sample so that it will coincide with the pick-up schedule of the courier for that area so that the sample will arrive within the 30-hour window.
 - **Personal safety:** The time frame may be extended if certain conditions (severe weather; natural disaster, such as fire or flood) would put the sample collector in danger.
2. **Determining when a positive routine sample is caused by distribution conditions:** DWP may waive the triggered source requirement if the water system has prior documentation of a distribution system issue that is responsible for the original positive sample, rather than source contamination. Possible examples include:
- **Biofilm in distribution:** If recurring biofilm issues have been documented within the distribution system, and the positive result is convincingly related to this biofilm growth.
 - **Storage tank contamination:** If a storage tank inspection revealed contamination (such as observed debris inside the tank).
 - **After a mainline repair or repair of a storage tank.**
 - **Low pressure or cross-connection incident:** If a zone of the distribution system experienced negative or low water pressure, or if the result is due to a recently observed (and documented) cross-connection incident.
3. **Invalidating a fecal-positive groundwater source sample:** DWP will allow invalidation of a fecal-positive source sample if *either* the lab documents that improper sample analysis has occurred (improper method, or excursion of the 30-hour limit between sample collection and initiation of analysis), *or* the water system

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provides adequate documentation that the sample does not reflect true source water quality. The system will need to collect a follow-up source sample within 24 hours of invalidation.

4. Source sample location: Source water samples are to be collected at a location prior to any treatment. Sampling after treatment will only be allowed if (1) the treatment will have no impact on microbial quality of the water, and (2) it is not currently possible to directly sample the untreated water. Not having a raw water sample tap is a significant deficiency, which a water system will need to correct within 120 days after receiving written notice of the deficiency.

5. Determination/confirmation of 4-log viral inactivation before or at the entry point: By Dec. 1, 2009, groundwater systems with fecally contaminated sources will be required to (1) demonstrate that they achieve 4-log inactivation of viruses, and (2) begin compliance monitoring at the entry point. DWP previously notified all groundwater systems that add chlorine or chloramines of this requirement, and outlined the information necessary to document 4-log viral inactivation: contact volume, tank baffling (if any), maximum demand flow rates, coldest water temperature, pH, and contact time calculations. DWP will not routinely require tracer studies for groundwater systems to document adequate contact time. If DWP recently completed a plan review that included disinfection, this may be submitted as part of the 4-log documentation.

DWP is currently reviewing system submittals to verify adequate disinfection. Systems with adequate 4-log treatment will receive notification that includes a minimum chlorine residual level to be maintained at the entry point, and the compliance monitoring requirements.

Note that as of Dec. 1, 2009, any groundwater system that is not performing compliance monitoring at the entry point will be required to take triggered source water sample(s) after a routine positive.

6. Alternative technologies and 4-log inactivation of viruses: At this time, DWP does *not* approve of the use of alternative treatment technologies alone, such as ultraviolet (UV) disinfection, to meet the 4-log viral inactivation requirement of the GWR (if applicable) for the following reasons:

- **Limitations of UV for viruses:** Adenoviruses in particular are very difficult to treat with UV disinfection. For most technologies, the UV dose required for 4-log inactivation of *all* viruses is 186 millijoules per square centimeter. Currently, there is no one UV disinfection unit commercially available that is capable of meeting this dose criterion, and thus achieve 4-log inactivation of viruses as a stand-alone device. Should this situation change, DWP will reexamine this policy.

- **Challenges of tracking and monitoring UV performance:** Unlike chlorine, there is no residual concentration to test after UV exposure to ensure adequate disinfection. Instead, systems must frequently monitor parameters such as UV intensity, flow rate, lamp status, and UV calibration. This type of monitoring can be challenging, particularly for small groundwater systems using UV.

7. Criteria for DWP to approve discontinuing 4-log inactivation of viruses: A groundwater system may discontinue 4-log inactivation of viruses when one year of monthly samples (12) demonstrate the absence of any coliform in the source water. DWP would also allow discontinuation of 4-log inactivation if a system switched to a source that is free of microbial contamination. Those systems that discontinue this level of treatment will be subject to the triggered source monitoring requirements. DWP will also consider the system's ability to maintain water quality throughout the distribution system.

James Nusrala is a regional engineer with the Drinking Water Program / 971-673-0459 or james.b.nusrala@state.or.us

Significant deficiencies:

What's new for GW systems

by James Nusrala

Background

As many of you know, water system surveys (previously referred to as sanitary surveys) are performed every three to five years. The surveys are a comprehensive investigation and review of the ability to provide drinking water to the public that is safe for human consumption, according to eight specific components: source of supply, treatment, storage, distribution, pumping, monitoring, management and operations, and operator certification. The Drinking Water Program (DWP), county, or Department of Agriculture partner has the responsibility to provide the water system a written list of any significant deficiencies, or any violations of drinking water regulations, within 30 days of the survey.

What's new

1. For all groundwater systems, DWP now has explicit authority to require corrective action for any significant deficiency or rule violation according to the schedule outlined in OAR 333-061-0076 (6) (b). Specifically, *after the date the groundwater system receives written notification of a significant deficiency or rule violation* (usually the date when the survey report is received) the groundwater system must:
 - Consult with its regulating agency (DWP, the county, or Department of Agriculture partner) within 30 days; and
 - Correct each significant deficiency, or be in compliance with a schedule for corrective action, within 120 days.
2. Additionally, this authority to require corrective action applies to groundwater systems even if they were constructed or installed prior to the adoption of our construction standards (in 1981), outlined in OAR 333-061-0050. These standards are the basis for many of the significant deficiencies.
3. Any groundwater system failing to comply with the corrective action requirements for

significant deficiencies or rule violations will receive a violation and be required to issue a Tier 2 (30-day) Public Notice.

4. The illustration (opposite page) shows the significant deficiencies and significant rule violations broken up by survey component, with the specific rule citation for each. If a deficiency applies only to certain types of water systems, that is specified as follows: community (CWS), non-transient non-community (NTNC), and transient non-community (TNC). We encourage all systems to review this list and address any issues before the survey to take the most proactive approach to protecting public health.

We'd like to draw attention to the following significant deficiencies – their connection to GWR compliance is explained in parentheses:

- Lack of raw water taps for wells and springs. (A raw coliform sample is *required* from each active source after a routine positive for systems not performing 4-log viral inactivation compliance monitoring.)
- Minimum CT requirement not met at all times and not calculating CT values correctly. (Systems performing compliance monitoring will be required to report residual measurements monthly; CT calculations will be reviewed during the survey.)
- Annual raw water sampling past due. (Under the Triggered Source Monitoring option, systems will be required to take a minimum of one raw water sample a year.)
- No Coliform Sampling Plan. (This plan must now include source samples if applicable.)
- Emergency Response Plan not completed. (Under the GWR, systems should be prepared to issue public notices and take appropriate corrective actions in the event of a fecal positive source sample – one possible option is to connect to a source free of fecal contamination.)

James Nusrala is a regional engineer with the Drinking Water Program / 971- 673-0459 or james.b.nusrala@state.or.us

Source Deficiencies:

Well Construction Deficiencies (OAR 333-061-0076):

- ⊕ Sanitary seal and casing not watertight
- ⊕ Does not meet setbacks from hazards
- ⊕ Wellhead not protected from flooding
- ⊕ No raw water sample tap
- ⊕ No treated sample tap (if applicable)
- ⊕ No screen on existing well vent

Spring Source Deficiencies (OAR 333-061-0076):

- ⊕ Springbox not impervious durable material
- ⊕ No watertight access hatch/entry
- ⊕ No screened overflow
- ⊕ Does not meet setbacks from hazards
- ⊕ No raw water sample tap
- ⊕ No treated sample tap (if applicable)

Treatment Deficiencies/Violations:

Surface Water Treatment Deficiencies:

- + Turbidity standards not met-0030(3)
- + Turbidimeters not calibrated per manufacturer or at least quarterly-0036(5)(b)(A)
- ⊕ Incorrect location for compliance turbidity monitoring
- ⊕ If serving > 3,300 people no alarm or auto plant shut off for low chlorine residual
- ⊕ For conventional or direct filtration: No alarm or plant shut off for high turbidity
- ⊕ For conventional filtration: Settled water not measured daily
- ⊕ For conventional or direct filtration: Turbidity profile not conducted on individual filters at least quarterly
- ⊕ For cartridge filtration: No pressure gauges before and after cartridge filter
- ⊕ For diatomaceous earth filtration: Body feed not added with influent flow
- + For membrane filtration: Turbidimeter not present on each unit-0050(4)(c)(G)
- + For membrane filtration: Direct integrity testing not done at least daily-0036(5)(b)(F)

Disinfection Deficiencies/Violations:

- + DPD or EPA approved method not used-0036(9).
- + Free chlorine residual not maintained-0032(3/5)
- + Chlorine not measured & recorded as required-0036(9)
- + Minimum CT requirement not met all times-0032(3/5)
- ⊕ No means to adequately determine flow rate on contact chamber effluent line
- + pH, Temperature, and chlorine residual not measured daily at first user-0036(5)(a/b)

- ⊕ Failure to calculate CT values correctly
- ⊕ No means to adequately determine disinfection contact time under peak flow and minimum storage conditions
- + Annual raw water sampling past due-0036(6)(w)

UV Disinfection Violations (OAR 333-0050(5)(k)):

- + Bypass around UV system
- + Lamp sleeve not cleaned
- + Lamp not replaced per manufacturer
- + No intensity sensor with alarm or shut-off
- + Annual raw water sampling past due-0036(6)(w)

Other Treatment Violations:

- + Non-NSF approved chemicals-0087(6)
- + Corrosion control parameters not met-0034

Distribution System Violations:

- + System pressure < 20 psi. -0025(7)

Cross Connection (OAR 333-061-0070):

- + No ordinance or enabling authority (CWS)
- + Annual Summary Report not issued (CWS)
- + Testing records not current (CWS, NTNC, TNC)
- + No Cross Connection Control Specialist (CWS ≥ 300 connections)

Finished Water Storage Deficiencies:

- ⊕ Hatch not locked or adequately secured
- ⊕ Roof and access hatch not watertight
- ⊕ No flap valve, screen, or equivalent on drain.
- ⊕ No screened vent

Monitoring Violations:

- + Monitoring not current-0025(1)
- + MCL violations-0030
- + No Coliform Sampling Plan-0036(6)(b)(G)

Management & Operations Violations:

- + No operations and maintenance manual. -0065(4)
- + Emergency response plan not completed. -0064(1)
- + Major modifications not approved (plan review). -0050
- + Master plan not current (≥ 300 con.)-0060(5)
- + Annual CCR not submitted (CWS)-0043(1)(a)
- + SNC or out of compliance with AO
- + Public notice not issued as required-0042

Operator Certification Violations:

- + No certified operator at required level-0065(2).
- + No protocol for under certified operator-0225(5).

Other Rule Violations: _____

⊕ Significant deficiency per OAR 333-061-0076
+ Significant rule violation per OAR 333-061-XXX

Assessment monitoring of groundwater sources is expected to begin in 2010

by Bill Goss

Assessment monitoring was mentioned in the Winter 2009 Pipeline article "Get Ready for the Ground Water Rule." This type of monitoring is expected to begin in 2010, so it is time for a more detailed look at this aspect of the rule.

The Ground Water Rule uses the term "assessment monitoring" for sampling source water from either wells or springs. *Systems that do not treat their groundwater are*, in effect, already sampling the microbial content of their source water via their routine coliform samples. *Groundwater systems that treat their water* with a chemical disinfectant such as chlorine or use ultraviolet (UV) and opt for Triggered Source Monitoring (i.e., have not submitted forms showing 4-log inactivation of viruses) will be required to collect at least one annual raw water sample from each source. These raw water samples are intended to provide information on the water quality of sources. They are necessary because routine coliform samples of finished ("treated") water in the distribution system may not reveal source contamination. For these systems, assessment monitoring will take the form of one annual sample from each source.

In addition, the Oregon Department of Human Services Drinking Water Program (DWP) has identified a group of groundwater systems that are at higher risk for fecal contamination based on the criteria below. Systems that treat their water with a chemical disinfectant or use UV and have not demonstrated 4-log inactivation of viruses will be required to collect 12 consecutive monthly source samples as their form of assessment monitoring. Systems that operate seasonally must collect source samples in each month that water is provided to the public.

Groundwater systems that meet one or more of the following conditions will be considered for 12-month source monitoring:

- At least one total coliform positive sample result from the source water.

- A groundwater source that has been determined by DWP to be susceptible to fecal contamination through a Source Water Assessment or equivalent hydrogeologic assessment. A groundwater system is identified as susceptible to fecal contamination when a source is considered highly sensitive (due to aquifer characteristics, vadose zone characteristics, monitoring history, or inadequate or unknown well or spring collector construction) and there is a fecal contaminant source within the two-year time-of-travel zone, outreach area, or zone 1 (nearest) area for a spring.
- A source that draws water from an aquifer that DWP has identified as being fecally contaminated.
- A groundwater source that is highly sensitive and is located within an area that has a high density of Underground Injection Control wells.

Other conditions may be considered on a case-by-case basis in DWP's decision to require assessment monitoring.

Systems required to conduct 12 months of source water monitoring will be contacted by mail with details on which sources to sample and the starting date of the 12-month sampling period.

If all 12 monthly samples test absent for coliform bacteria, the system will *only* be required to collect an annual raw coliform sample from each source. If any samples test positive for *E.coli*, DWP will instruct the system to take appropriate corrective action, which could include connecting to a source free of microbial contamination, or providing additional treatment.

If your water system has already collected 12 months of source/raw water samples as a result of other monitoring requirements (e.g., evaluation for groundwater under the direct influence of surface water, or if treatment was suspended since the last survey without state notification, etc.), please contact the Drinking Water Program.

Bill Goss is a civil engineer in the Technical Services Unit of the Drinking Water Program / 541-966-0900 or william.h.goss@state.or.us

Implementing Stage 2 compliance monitoring plans

by Carrie Gentry

Many water systems have completed standard monitoring for their initial distribution system evaluation (IDSE) as required under the Stage 2 rule. Systems with populations under 50,000 may be finishing up their IDSE reports earlier than the schedule listed in Table 1 below. Our program has received a few inquiries recently, asking what water systems need to do between the time the IDSE is due and compliance monitoring begins. Aside from continuing to meet the Stage 1 rule, one item that can be addressed in the interim is the Stage 2 compliance monitoring plan.

All water systems that are required to monitor under the Stage 2 Disinfection Byproduct Rule (DBPR) must create a compliance monitoring plan. Surface water and groundwater under the direct influence of surface water (GWUDI) systems with populations over 3,300 – as well as their purchasers, regardless of size – must submit their compliance monitoring plans prior to the dates listed in the last column of Table 1. All other water systems should maintain a copy of the compliance monitoring plan in their water system records and make it available for review during water system surveys. This article only addresses compliance

monitoring plans for systems that chose the standard monitoring IDSE option. A future article will discuss compliance monitoring plans for systems that obtained a 40/30 waiver or very small system waiver. (See Table 1 below.)

Systems that submit compliance calculations with their IDSE reports do not need to submit a separate compliance monitoring plan. The state Drinking Water Program will acknowledge the inclusion of compliance calculations when reviewing and approving IDSE reports. For those systems that do not include the compliance calculations, the following paragraphs describe the three required elements of the compliance monitoring plans.

1. Monitoring locations included

Water systems must submit monitoring locations with the compliance monitoring plan. These should be the same locations proposed in the water system’s IDSE report or match any modifications made by the state. Exceptions to this include instances where the system has made significant changes in treatment, distribution system operations and layout, or other factors that may affect TTHM or HAA5 formation. If there are any changes to the monitoring locations, systems must replace existing compliance monitoring locations with expected high TTHM or HAA5 levels.

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Table 1: Compliance Monitoring Dates for Stage 2 DBPR

System type and population	Schedule number	Submit IDSE report	Begin Stage 2 compliance monitoring
Community and NTNC ≥100,000	1	January 1, 2009	April 1, 2012
Community and NTNC 50,000 – 99,999	2	July 1, 2009	October 1, 2012
Community and NTNC 10,000 – 49,999	3	January 1, 2010	October 1, 2013
Community and NTNC < 10,000	4	July 1, 2010 (community systems only)	October 1, 2013

The submitted monitoring locations can either be addresses of the locations or descriptions of the locations.

Example: Stage 2 DBPR sites:

Sample Station (SS) #21
SS #22
SS #23
SS #24

2. Monitoring dates included

Water systems must submit monitoring dates. These should be the same dates as proposed in the IDSE report. The dates are based on the system's highest historical month. Once the highest historical month has been identified, and if quarterly or more frequent routine monitoring is required, water systems must schedule monitoring at a regular frequency of approximately every 90 days.

Water systems that conduct quarterly monitoring need to begin monitoring in the calendar quarter that includes the date in the last column of Table 1. For example, if a schedule 3 water system's highest historical month is in May, then one of the four monitoring periods must occur in May. A schedule 3 water system begins compliance monitoring October 1, 2013. With a highest historical month of May, that system would monitor November 2013, February 2014, May 2014, August 2014, etc.

Water systems that conduct monitoring less frequently than quarterly must begin monitoring during the month recommended in the water system's IDSE report.

Example: Stage 2 DBPR dates for a schedule 3 system:

Our system is required to monitor quarterly. As described in our IDSE report, compliance monitoring will begin the second week of November 2013, and then approximately every 90 days.

3. Compliance calculation procedures included

Compliance calculation procedures should discuss how the water system will calculate locational running annual averages (LRAAs). The LRAA must be below 0.080 mg/L for TTHM and below 0.060 mg/L for HAA5. Remember that these are *locational* running annual averages. LRAAs must be calculated at each compliance monitoring location identified in the IDSE report. OAR 333-061-0036 (4)(d)(B) discusses how to make compliance calculations:

Water systems **required to conduct quarterly monitoring** must make compliance calculations at the end of the fourth quarter following the compliance date specified in Table 1, and at the end of each subsequent quarter. The LRAA must be calculated prior to the fourth quarter if fewer than four quarters of data would cause the MCL to be exceeded, regardless of the monitoring results in subsequent quarters.

- Compliance is calculated for each LRAA as: $(Q1 + Q2 + Q3 + Q4)/4 < \text{MCL}$ for each location.

Water systems **required to conduct annual monitoring** must make compliance calculations beginning with the first sample collected after the compliance date specified in Table 1.

- Compliance is calculated as sample result $< \text{MCL}$ for each location.

Water systems that take **more than one sample per quarter** at a specific monitoring location must average all samples taken in the quarter for that location to determine a quarterly average.

- Compliance is calculated for each LRAA as: $(\text{sum of all samples taken in the quarter for that location}) / \text{total number of all samples taken in the quarter for that location} < \text{MCL}$.

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Example: Stage 2 DBPR compliance calculations:

Our system is required to monitor quarterly. Each quarter we will calculate a locational running annual average (LRAA) for TTHM and HAA5 at each monitoring location, beginning in the second quarter of 2012. Compliance calculations will start at the end of the first quarter of 2013. Compliance will be achieved if the TTHM and HAA5 LRAA at each monitoring location for the four most recent quarters is less than or equal to 0.080 mg/L for TTHM and less than or equal to 0.060 mg/L for HAA5. The LRAA will be calculated prior to the fourth quarter of data if fewer than four quarters of data would cause the MCL to be exceeded, regardless of the monitoring results in subsequent quarters.

- Compliance is calculated for each LRAA as: $(Q1 + Q2 + Q3 + Q4)/4 < \text{MCL}$ for each location.

Water systems can turn in their compliance monitoring plan at any time prior to the dates listed in Table 1. Our staff will review the submitted plan and unless changes are required, return an approval letter to the water system. Plans should be submitted to:

Drinking Water Program
Attn: Stage 2 team
PO Box 14450
Portland, OR 97293-0450

The compliance monitoring plan should be viewed as a dynamic document, in need of occasional updating. Significant changes to disinfection, sources, storage or distribution system that are likely to impact the formation of DBPs require a change to the compliance monitoring plan.

Carrie Gentry is a regional engineer assistant in the Technical Services Unit of the Drinking Water Program / 971-673-0191 or carrie.l.gentry@state.or.us

Groundwater systems can be outstanding performers, too!

by Betsy Parry

No longer the exclusive domain of surface water systems, the recent updates to our program's Oregon Administrative Rules means that groundwater systems also are now eligible for the designation of "outstanding performer." This designation entitles community systems to have their on-site survey frequency reduced from every three years to every five years, saves them money with less frequent survey fees, and gives them something to tout to their customers.

During a water system survey, groundwater systems will be evaluated against the *same* outstanding performance criteria as surface water systems (see related Summer 2008 Pipeline article):

1. No maximum contaminant level (MCL) or treatment technique violations in the last five years;
2. No more than one monitoring and reporting violation in the last three years. The one violation must be resolved (results submitted);
3. No significant deficiencies identified during the current water system survey; and
4. No waterborne disease outbreak attributable to the water system in the last five years.

Systems that meet these criteria will be notified in the cover letter accompanying the water system survey report. The outstanding performer designation will remain in effect as long as the criteria continue to be met.

Oregon's Drinking Water Program (DWP) challenges ALL community systems to meet the outstanding performer criteria. Any questions should be directed to your system's regional DWP or County Health Department staff person, or you may call DWP at 971-673-0405.

Betsy Parry is a natural resource specialist with the Drinking Water Program / 541-726-2587, Ext. 30, or betsy.l.parry@state.or.us

The Long Term 2 Enhanced Surface Water Treatment Rule (LT2)

by Scott Curry and Kari Salis

Introduction

LT2 builds on existing surface water treatment rules by requiring additional treatment for those surface water sources that have demonstrated a vulnerability to contamination by *Cryptosporidium*. This rule requires all classifications of public water system using surface water, or groundwater under the influence of surface water, to monitor their source water for *E. Coli* or *Cryptosporidium*, calculate an average *Cryptosporidium* concentration, and use those results to determine if their source has a high enough risk of *Cryptosporidium* to require additional treatment.

The key elements of the rule are as follows:

- Based on *Cryptosporidium* concentration, filtered systems will be classified into one of four possible risk categories (bins), and requirements for additional treatment may apply.
- Unfiltered systems will be classified into one of two categories: one that requires 2-log additional treatment, and one that requires 3-log additional treatment. All unfiltered systems must provide two forms of disinfection.
- This rule also includes a requirement that existing uncovered finished water storage reservoirs must be covered or the discharge must be treated.
- Criteria and guidance have also been developed for certifying the effectiveness of ultraviolet light (UV) disinfection and verifying challenge studies for membrane and cartridge filters. We are in the process of developing a new list of these approved technologies, and we recommend that you consult with our staff if you are considering this type of treatment.

- In addition to these current requirements, systems must conduct a second round of source water monitoring for *E. Coli* and/or *Cryptosporidium* nine years after the initial sampling has begun.

Important dates

Larger water systems (serving more than 10,000 population) have already started monitoring for *E. Coli* and crypto.

Systems serving fewer than 10,000 people should be completing their 12 months of source water monitoring for *E. Coli* this year and, *if triggered into crypto monitoring*, will follow the schedule below:

By January 1, 2010: Submit a sampling schedule that specifies the dates of sample collection and the location of the raw water sampling point. The basic sampling schedule is either once per month for 24 months or twice per month for 12 months. Check with your lab to see which schedule would be more appropriate.

By April 2010: Begin 12 or 24 months of source water monitoring. The Drinking Water Program will likely have primacy for this rule at this point; the affected systems will be notified where to send their test results.

By March 2012: Small systems will have completed their initial round of source water monitoring, and their bin classifications will be determined within six months. If additional treatment is necessary, it must be installed by October 2016.

For “state-regulated” water systems, the current requirement is to begin *E. Coli* sampling by April 1, 2012. Results from the larger water systems will be evaluated at a later date to determine if this requirement can be modified.

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BIN CLASSIFICATIONS AND TREATMENT REQUIREMENTS

Based on average *crypto* concentrations, systems are classified in Bins 1 through 4:

Mean <i>Cryptosporidium</i> concentration	Bin Classification
≤ 0.075 <i>crypto</i> oocysts/L, including water systems serving fewer than 10,000 people OR all systems not required to monitor for <i>crypto</i> (did not exceed <i>E. Coli</i> trigger).	Bin 1
> 0.075 oocyst/L to < 1.0 oocysts/L	Bin 2
≥ 1.0 oocysts/L to ≤ 3.0 oocysts/L	Bin 3
> 3.0 <i>Cryptosporidium</i> oocysts/L	Bin 4

Bin classification determines how much additional *crypto* treatment is required:

Bin Classification	Type of SWTR Filtration Treatment and <i>Crypto</i> Treatment Requirement			
	Conventional Filtration	Direct Filtration	Slow Sand or DE Filtration	Alternative Technologies
1	No additional Treatment	No additional Treatment	No additional Treatment	No additional Treatment
2	1-log treatment	1.5-log treatment	1-log treatment	Total must be 4.0 log
3	2-log treatment	2.5-log treatment	2-log treatment	Total must be 5.0 log
4	2.5-log treatment	3-log treatment	2.5-log treatment	Total must be 5.5 log

SUMMARY

Surface water sources that are judged to be vulnerable to contamination by *Cryptosporidium* will be required to install some form of additional treatment. There are a number of options for these treatment credits, including additional filtration, ozone, UV, and improved filter performance. DWP staff will evaluate any proposals for these treatment credits. We are hoping that there are only a few systems that will require additional treatment.

Scott Curry is an environmental engineer in the Technical Services Unit of the Drinking Water Program / 541-776-6228, Ext. 284, or scott.g.curry@state.or.us

Kari Salis is an environmental engineer in the Technical Services Unit of the Drinking Water Program / 971-673-0423 or karyl.l.salis@state.or.us

Department of Human Services
Drinking Water Program
P.O. Box 14450
Portland, OR 97293-0450



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