

Confirmed *E. coli* Positive in a Groundwater Source

Subject:	Investigation and correction of confirmed <i>E. coli</i> positive in a groundwater source	Date:	4/5/12
Unit:	Technical services (jn, tp, ss, cm, cl)	Revised:	6/22/16, 3/5/18 (mb)
Purpose & Scope: This procedure provides DWS technical services staff and partner regulating agencies with a consistent procedure when <i>E. coli</i> has been confirmed in the ground water source.			
Procedure/Process: Describes the chronological process for compliance with the Groundwater Rule (GWR) when <i>E. coli</i> is confirmed in a groundwater source, including source evaluation and selecting applicable corrective action options.			

1. Initial contact with PWS

- A. If notified of the presence of *E. coli* by a water quality alert based on a triggered or an assessment monitoring source sample, the PWS is required to collect five (5) confirmation samples within 24 hours of notification of the initial *E. coli* lab results.
- B. Interim corrective action measures may be taken any time after collection of confirmation samples. Water systems should not shock chlorinate the source prior to collecting the 5 confirmation samples.
- C. Regulating agency staff will notify the PWS of the *E. coli* positive detection and the requirement of the 5 confirmation samples required by OAR 333-061-0036 (6)(j). In addition, a letter will also be sent by the DMCE unit informing the PWS of the requirement in writing. A copy of this letter will be sent to the regulating agency via email.
- D. If at least one of the confirmation samples confirms the presence of *E. coli*, the initial *E. coli* contamination is confirmed at that source and corrective action is required under the GWR. For systems with a single service connection (e.g. hand pump systems), confirmed *E. coli* contamination requiring corrective action occurs when one of the five confirmation samples collected from the hand pump is *E. coli* positive, or any two samples collected within 30 calendar days of each other are *E. coli* positive, when five confirmation samples are not collected right away after the initial *E. coli* positive sample.
- E. After the confirming samples are received by DWS, another alert is issued to the regulating agency, the technical services representative and regional hydrogeologists. An auto-generated letter is sent to the PWS (with CC via email to those that received the alert) notifying the operator of the 4 corrective action options and the required timeline (30 days to consult with regulator and 120 days for corrective action to be completed or be on an approved corrective action plan schedule). A boil water public notice template is included with the auto-generated letter to the system. See example of this auto-generated letter at end of this procedure.
- F. The regulating agency staff need to first determine the following:
 - i. Appropriate public notice-If the water system cannot provide documentation that 4-log inactivation of viruses was occurring at the time *E. coli* was detected, the PWS is required to issue a boil water notice (boil template supplied with auto-generated letter to water system).
 - ii. Did the water system or regulator identify a removable fecal contaminant-(temporary source of contamination) and potential pathway of contamination?

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- a. If a temporary source of contamination is identified and removed, then no source evaluation is needed. **This includes the required correction of all groundwater source related significant deficiencies.**
 - b. If no temporary source of contamination is identified, send the hydrogeologist a well evaluation request– proceed to section 2.
- iii. Application of disinfection during the interim period
- a. If the confirmed source has chlorination installed, a calculation must be performed to verify if the system can achieve 4-log inactivation of viruses by maintaining a minimum chlorine residual at all times. A [disinfection verification form](#) is available to document the calculation. Contact time calculations must be verified by OHA technical staff. If the system can achieve 4-log inactivation of viruses they must immediately start monthly compliance monitoring reporting in the interim until final corrective actions are completed.
 - b. Water systems that cannot meet 4-log inactivation of viruses must promptly take measures to provide customers with potable water to lift the boil water notice as soon as possible (e.g., make operational changes and/or system improvements to achieve 4-log inactivation of viruses). A long-term boil water notice is not allowed due to numerous public health concerns. Refer eligible water systems to circuit rider if technical assistance is requested. Regulator needs to communicate to the water supplier the immediacy to lift the boil water notice to avoid further action by DWS.

2. Ground water source evaluation

- A. The source evaluation request shall be submitted to the regional hydrogeologist after one of five confirmation samples in the groundwater source confirms the presence of *E. coli*, and no temporary source of contamination was identified.
- B. The source evaluation request form (located on DW partners website)-needs to be filled out electronically by the regulating agency, then e-mailed to the regional hydrogeologist and copy the OHA tech staff person. All supporting documents shall be attached via email to the hydrogeologist.
- C. The regional hydrogeologist will return the completed well evaluation to the regulating agency and technical services staff member via email.
- D. If the contaminated source is being considered for GWUDI, refer to section 5 of the ***Hydrogeologist Responsibilities for Confirmed E. Coli & GWUDI Evaluation Procedure*** for guidance.

3. PWS consultation of corrective actions:

- A. Within 30 days of notification from laboratory results confirming *E. coli* contamination, the PWS representative and regulating agency should discuss which of the corrective action options has been selected. Discussion with the PWS should include the requirements of the selected option(s), interim public health protection measures (see section 4 for further explanation of corrective actions options), and any applicable plan review requirements. Once the well evaluation is completed, the regulator shall contact the system and discuss relevant

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requirements for continued use of the source. For example, if the well evaluation indicates the source is improperly constructed, providing 4-log treatment may no longer be an option for compliance.

- B. The regulating agent's discussion with the PWS shall be documented in a contact report. A letter can also be drafted with the decisions and established due dates keeping in mind the due date for corrective action completion. A copy of the letter should also go to the technical services representative and to the DWS system file in Portland.

4. Corrective action options according to OAR 333-061-0032(6)(e):

- A. Correct all significant deficiencies;
- B. Disconnect the groundwater source from the water system and provide an alternate source of water. If a disconnected well of unknown or suspect construction is or will be within 100 feet of a public water supply well, the disconnected well must be properly abandoned in accordance with 333-061-0050(2)(a)(E);
- C. Eliminate the source of contamination; or
- D. Provide treatment for the groundwater source that reliably achieves at least 4-log inactivation, removal, or a combination of inactivation and removal of viruses before or at the first customer. **If the groundwater source does not meet all of the applicable construction standards specified in OAR 333-061-0050(2)(a) or (b), and the Authority determines that reconstruction of the groundwater source will add a significant measure of public health protection, then the groundwater source must be made to meet all of the applicable construction standards specified in OAR 333-061-0050(2)(a) or (b) before treatment is applied as prescribed by OAR 333-061-0050(5)(b).**

5. Corrective actions further explained

- A. Eliminate the source of contamination:
 - i. Remove obvious source and cause of contamination including correcting any source related significant deficiencies.
 - ii. Reconstruction of the groundwater source may be required if it does not meet construction standards.
 - iii. Monthly follow-up assessment coliform samples will be required from the source after removing the temporary source of contamination for up to one year or reconfirmation of *E. coli* contamination (whichever occurs first).
- B. 4-log compliance monitoring
 - i. The regulating agency shall document how the PWS provides 4-log inactivation of viruses with the disinfection verification form or equivalent CT calculation.
 - ii. The regulating agency will report to DMCE (email using compliance.dw@state.or.us) the treatment change on the [Entry Structure Diagram Form](#). Use treatment code D-361 for permanent corrective action or Z-361 for interim compliance monitoring. In the comments field include the minimum chlorine residual and date the PWS will begin monitoring.

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- iii. The regulating agency will communicate compliance monitoring requirements to the PWS by sending out the [compliance monitoring letter](#) that assigns a minimum residual and a date to begin monitoring. Attached to the cover letter will be the [monthly monitoring form](#) specifying their minimum residual. Include DWS tech staff as a CC on the letter.

6. Documentation requirements and tracking

- A. The auto-generated letter sent by DWS (see 1.D above) required public notice to be issued immediately, with a copy sent to DWS, and that the system complete corrective action or be on an approved plan within 18 weeks. These actions will be tracked and shown on Data Online.
- B. The system should submit documentation that they have completed corrective action and/or submit their corrective action plan to the regulating agency. If acceptable (either completion or proposed due dates in the plan), the regulating agency needs to submit documentation, or a contact report, to DMCE by sending an email to Compliance.DW@state.or.us that lists the following:
 - i. The water system name and ID#
 - ii. For completed corrective actions, the date you were notified by the system
 - iii. For approved corrective action plan, report the notification date and the new due date.
- C. As a deadline to complete corrective actions nears and if no completion date has been entered, DMCE will send a reminder email two weeks before the deadline to the regulating agency. The regulating agency should contact the system operator to remind them of the deadline and requirement to complete the corrective action. Document any details in a contact report. If the operator needs more time and the regulating agency agrees the schedule needs to be modified, the operator must submit a revised plan in writing. Follow steps outlined in step 6.B above for a new corrective action plan.
- D. Sources being considered for GWUDI (refer to Procedure: ***Hydrogeologist Responsibilities for Confirmed E. coli & GWUDI Evaluation***).

Example of auto-generated confirmation letter sent by DMCE:

[DATE]

[Admin Contact]

[PWS name]

[PWS Address]

[PWS city, State, Zip]

Re: Confirmation of *E. coli* in source water at [facility name] ([facility ID]) on [original date] and [confirmed data]

Dear [Admin Contact]:

Confirmed *E. coli* Positive in a Groundwater Source

Recent source water samples confirm the presence of *E. coli*, an indicator of fecal contamination in the source water. Fecal contamination includes harmful bacteria and viruses that have the potential to cause serious gastrointestinal illness. Water containing *E. coli* is considered unsafe to drink.

Unless you are able to immediately verify that disinfection requirements have been met, you must issue a boil water public notice within 24 hours. A copy of the public notice must be received by the State Drinking Water Services by [PN due date]. This notice will be in place until the microbiological contamination issue has been resolved or interim disinfection meeting 4-log inactivation of viruses has been verified.

You now have the following four options for corrective action, upon approval of your Regulating Agency - [reg. agency]:

1. Inspect the groundwater source (wellhead or spring collector) and surrounding area for pathways of fecal contamination and correct any significant deficiencies;
 2. Disconnect the groundwater source from the water system and provide an approved alternate source of water;
 3. Identify and eliminate the cause of fecal contamination by documenting the contaminant type, its proximity to the groundwater source and the process of removal;
- or
4. If the groundwater source meets all applicable construction standards specified in OAR 333-061-0050(2), provide treatment that reliably achieves at least 4-log inactivation of viruses.

You must consult with your Regulating Agency within 30 days of receiving this letter to discuss appropriate corrective action. You must also complete the corrective action chosen or be in compliance with a written corrective action plan approved by your Regulating Agency no later than [30 day due date].

Furthermore, confirmed *E. coli* in WELL requires an evaluation by a state hydrogeologist to determine if the groundwater is under the direct influence of surface water. [PWS name] will be notified if additional monitoring is required.

Your immediate attention to this matter is appreciated. Please contact [reg. agency] at [reg. agency phone] to discuss this matter in more detail.

Drinking Water Services

Enc.: Public Notice Template

cc: [TS contact], DWS
[Hydro for county], DWS Hydrogeologist
[Reg. agency contact], [reg. agency]