

GROUNDWATER REGULATORY UPDATE - ILLINOIS

In November 2008, Baxter & Woodman published articles both online and in our print newsletter regarding upcoming developments on the Groundwater Rule (GWR). IEPA's stance on some of the implementation strategies has changed since that time. Read on for an updated summary of how IEPA plans to enforce the groundwater rule.

Important: Of all the GWR components described below, only the compliance monitoring requirements are currently in place. All other requirements, including specific corrective actions and future monitoring requirements, will not be finalized until December 2009.



Compliance Monitoring

1. Ongoing compliance monitoring requires monthly sampling of all wells (including emergency and backup wells) for total coliform and E. coli. At this time IEPA plans to continue compliance monitoring indefinitely. To find out if your groundwater system is keeping up with IEPA's compliance monitoring requirements, visit IEPA's interactive database, Drinking Water Watch, at <http://www.epa.state.il.us/water/drinking-water-watch/>.

2. To avoid monthly compliance monitoring on unused backup and emergency wells, properly abandon these wells and send abandonment forms to IEPA. Contact Andrea Rhodes at IEPA (Andrea.Rhodes@illinois.gov or 217-785-0561) to avoid compliance monitoring on normally active wells that are temporarily out of service for maintenance, and request an exemption from monitoring during the period when the well is out of service.

3. If compliance monitoring detects fecal indicators (coliform and/or E. coli) in the source water, repeat sampling is required and IEPA will follow up to determine if the detection was the result of a bad sampling location or flawed sampling technique. Barring these exceptions, IEPA will issue a Non-Compliance Advisory (NCA). An NCA is issued if raw water from any well in a water supply system meets one or more of the following criteria:

- a. 4 total coliform (TC) positives in any 12-month period.
- b. 3 TC positives and 1 E. coli positive in any 12-month period.
- c. 2 consecutive months of total coliform positive samples.
- d. 2 consecutive months of E. coli positive samples.

Important: An NCA will not be issued if the system already provides at least 4 log treatment of viruses using surface water type treatment (filtration) or other multiple barrier processes approved by IEPA.

4. If your system has not been issued an NCA, proceed to Step 10. If your system has been issued an NCA, proceed to Step 5.

What Does 4-log Removal of Biological Contaminants Mean?

This log-reduction terminology was developed as a way to express levels of decreased biological contamination in water by factors of 10 that could be easily converted to percent reduction. A 1 log reduction is equivalent to a 90 percent reduction. A 2 log reduction is 99 percent reduction and a 3 log reduction is 99.9 percent reduction. A 99.99 percent reduction in biological contaminants (such as viruses) is called a 4 log reduction.

How does the requirement for 4 log removal/inactivation of viruses protect public health? The IEPA has determined that the presence of microbiological pathogens in public water supplies is a health concern. If finished water supplies contain microbiological contaminants, illnesses and disease outbreaks may result.

The Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) sets enforceable drinking water treatment technique requirements to reduce the risk of such disease outbreaks. These treatment techniques primarily include various types of filtration, which must usually be preceded by some combination of coagulation, flocculation, and sedimentation processes. The rule also requires at least one disinfection process to follow filtration, including ultraviolet (UV) disinfection, ozonation, and/or chlorination. By following these treatment techniques as outlined in the LT2ESWTR, water systems can achieve 4 log virus reduction, thereby drastically reducing the risk for waterborne disease outbreak.

Corrective Actions

5. IEPA has issued NCAs to over 100 groundwater systems throughout the state, and follow-up evaluations and corrective actions are already being pursued in these cases. For future NCAs, the IEPA may take a phased approach, as described below. However, depending on the severity and duration of the violation, IEPA may go directly to issuing a Violation Notice.

- a. Installation of continuous disinfectant concentration analyzers is a possible first step in a corrective action. Depending on the findings, IEPA may require higher disinfectant concentrations in the interim while corrective measures are being investigated.
- b. Before issuing a Violation Notice, IEPA will often allow the groundwater system to conduct investigations to identify specific deficiencies, such as inspection of well casings to determine if defects are present that could allow bacteriological contaminants to enter the well.
- c. IEPA will typically follow up with a Violation Notice after the NCA has been issued. Depending on the specific situation for each groundwater system, the Violation Notice notifies the groundwater system that it must remedy specific deficiencies (such as lining a defective well casing), abandon the affected well, or provide enhanced water treatment within a prescribed timeline.

6. Enhanced water treatment or well abandonment will be required if no specific deficiencies are found, or if correcting the deficiencies does not eliminate the bacteriological contamination. In these cases, IEPA will classify the affected well either as an unsafe source or as being under the direct influence of surface water. If either of these designations is made, the affected groundwater system must enter into a Compliance Commitment Agreement with the IEPA to either enhance water treatment at the affected well, or abandon the well. The Compliance Commitment Agreement includes a detailed description of the changes the groundwater system will make, and the timeline within which these changes will be completed.

7. If enhanced treatment is required following a Violation Notice, two potential options exist under the Groundwater Rule, depending on the type of treatment already in place, and on how IEPA classifies the source water. Regardless, the water system will be required to provide 4 log virus removal/inactivation (see sidebar for details on virus removal/inactivation).

- a. **Unsafe Source** – This refers to a well or aquifer that exhibits bacteriological contamination, but is not necessarily under the direct influence of surface water.
 - 1) Install a second treatment barrier to remove or inactivate pathogens (in addition to the existing disinfection process).
 - 2) As an example, if a water system already uses chlorine gas for disinfection, ultraviolet disinfection added upstream of the chlorine feed point as a second barrier. IEPA would also require controls and instrumentation to continuously monitor UV dose and chlorine residual.
 - 3) Important: IEPA will determine whether to allow a second treatment barrier in lieu of full surface water treatment (filtration) on a case-by-case basis. Engineering studies and pilot testing would be required to satisfy IEPA that the second barrier is adequate to protect public health and that filtration is not required. Further, it is unlikely that IEPA would award any virus inactivation credits for UV disinfection, meaning that the water system would have to have a high enough CT value (and enough chlorine contact time) to achieve 4 log virus inactivation through chlorination alone.
- b. **Source Under the Direct Influence of Surface Water** – This refers to an aquifer whose water quality is directly influenced by surface waters. These groundwater sources are more likely to have elevated turbidity and contain pathogens normally found in surface water, such as *Cryptosporidium* and *Giardia*.
 - 1) Due to the higher turbidity and occurrence of a wider range of pathogens in groundwater that is under the direct influence of surface water, merely adding a second treatment barrier is not sufficient to protect public health.
 - 2) Enhance treatment to meet the Surface Water Treatment Rule (SWTR).
 - 3) Filtration must be added to the treatment process to meet SWTR requirements, and water monitoring requirements are more rigorous.

c. Emergency wells – Many communities that purchase treated surface water retain emergency wells that can be used if their primary water supply is interrupted. In these systems, the emergency well typically has no treatment other than disinfection. If correction of deficiencies such as a faulty casing does not resolve bacteriological issues, the IEPA will require either abandonment or enhanced treatment such as UV disinfection or filtration.

8. Groundwater systems required to provide enhanced treatment must notify IEPA in writing by December 1, 2009, if they provide 4 log virus treatment at the water source.
- a. Methods for meeting this virus removal/inactivation requirement include various combinations of filtration (some times preceded by coagulation and sedimentation), chemical disinfection, ultraviolet disinfection and other processes as described in the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR).
 - b. As part of LT2ESWTR requirements, these systems will also have to begin continuous chlorine residual monitoring by December 2009.

9. (Continuing from Step 3) IEPA does not currently plan to require enhanced treatment or continuous disinfectant concentration monitoring for systems that have no bacteriological contamination issues.

Sanitary Surveys

10. The GWR will require that IEPA (not the groundwater systems themselves) complete sanitary surveys for every groundwater system on a regular basis. Sanitary surveys serve to identify significant deficiencies in groundwater systems that could allow contaminants to enter the systems.
- a. The eight elements evaluated in a sanitary survey are the water source, pump facilities, treatment, distribution system, finished water storage, system management and controls, monitoring and reporting requirements, and operator compliance with regulations.
 - b. IEPA must complete sanitary surveys within prescribed timelines:
 - 1) Community water supply – every three years
 - 2) Non-community water supply – every five years
 - 3) Community water supply with 4 log virus treatment or with outstanding performance as determined by IEPA – every five years

Summary

If you have any questions on this article, or if you need assistance responding to a Non-Compliance Advisory or Violation Notice, please contact Carolyn Grieves at cgrieves@baxterwoodman.com or Kristin Rehg krehg@baxterwoodman.com.