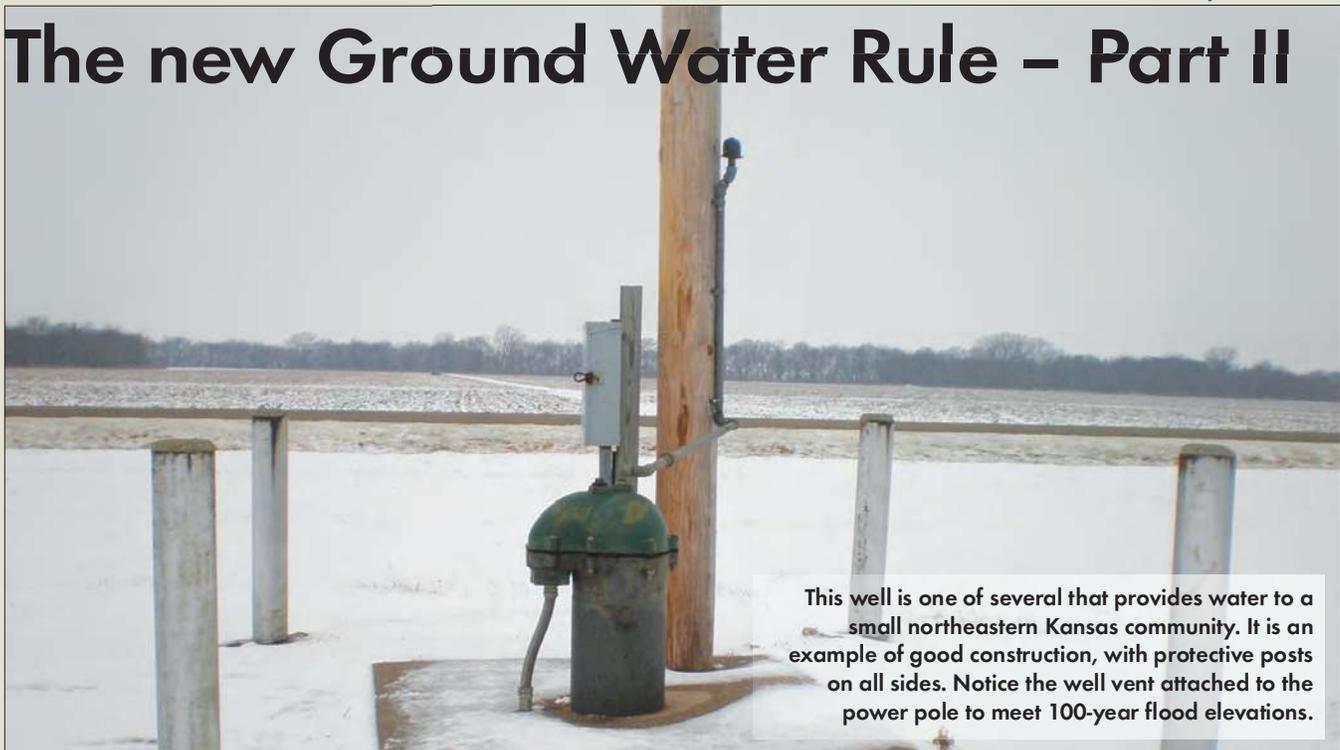


COMPLIANCE DATE IS DECEMBER 1, 2009

The new Ground Water Rule – Part II



This well is one of several that provides water to a small northeastern Kansas community. It is an example of good construction, with protective posts on all sides. Notice the well vent attached to the power pole to meet 100-year flood elevations.

Source Water Monitoring (Assessment, Triggered and Additional Source Water Monitoring)

In the July issue of *The Kansas Lifeline* magazine, (Ground Water Rule – Part I, pp 16-19), I discussed key provisions of this rule, the relationship between the Ground Water Rule (GWR) and the Total Coliform Rule (TCR) and how to actually calculate “CT” (chlorine residual x contact time) between the point of chlorination and the first customer. I also discussed the importance of reviewing TCR sample collection procedures. In order to avoid source water monitoring, it is important to ensure proper sample collection procedures, proper operation of the distribution system and proper well construction and maintenance. In this article, “Ground Water Rule – Part II”, I will discuss the different types of source water monitoring required by the rule. These include assessment, triggered and additional source water monitoring.

While assessment source water monitoring is not required

by the GWR, it is one of the options available to achieve compliance. Assessment source water monitoring is monitoring conducted prior to the GWR taking effect on December 1, 2009. Instead of using total coliform, it is suggested that a fecal indicator such as *E. coli* be used. Such testing is intended for systems that appear most susceptible to fecal contamination. If fecal contamination is found, the

system must provide Tier 1 public notification and take corrective action to remedy the problem. EPA has suggested each system collect a minimum 12 monthly samples for each well to assess seasonal changes. KDHE will not require systems to conduct assessment source water monitoring.

The July 2009 article briefly discussed triggered source water monitoring. Triggered source water monitoring will be required of all systems that do not provide 4-log treatment, do not conduct compliance monitoring and have

In order to avoid source water monitoring, it is important to ensure proper sample collection procedures, proper operation of the distribution system and proper well construction and maintenance.

a coliform-positive distribution system sample after December 1. Coliform-positive distribution system samples may indicate a contamination problem with a well. Triggered monitoring can also be required of systems that sell water to consecutive (purchasing) systems, should the consecutive system experience a coliform-positive distribution system sample. Under the Ground Water Rule, consecutive systems are required to notify their supplying wholesale system of a coliform-positive sample within 24 hours. If the system selling water (wholesale system) is not providing 4-log treatment, all of their wells must be sampled for E. coli. If any of these triggered source water samples are positive for E. coli, the wholesale system must immediately notify all consecutive systems served. Also, the wholesale system in this instance and all consecutive systems must issue Tier 1 public notices within 24 hours as E. coli contamination can have acute health effects. Obviously, such a situation can create conflict between sellers and purchasers.

Additional sampling is sampling required after a system has a fecal-positive source water sample. KDHE will send such systems five (5) additional samples that must all be collected at the specific well that tested fecal-positive. These samples must be collected at least 30 minutes apart. If any of these samples are again fecal-positive, KDHE will require corrective action be taken to find and eliminate the source of fecal contamination. The system may also be asked to take the well out of service until the problem is corrected.

Finally, all systems with new wells placed in service after November 30, 2009 will be required to either verify 4-log treatment and begin compliance monitoring within 30 days or conduct source water monitoring as required by KDHE. This may be required prior to delivering water to the public from any new well.

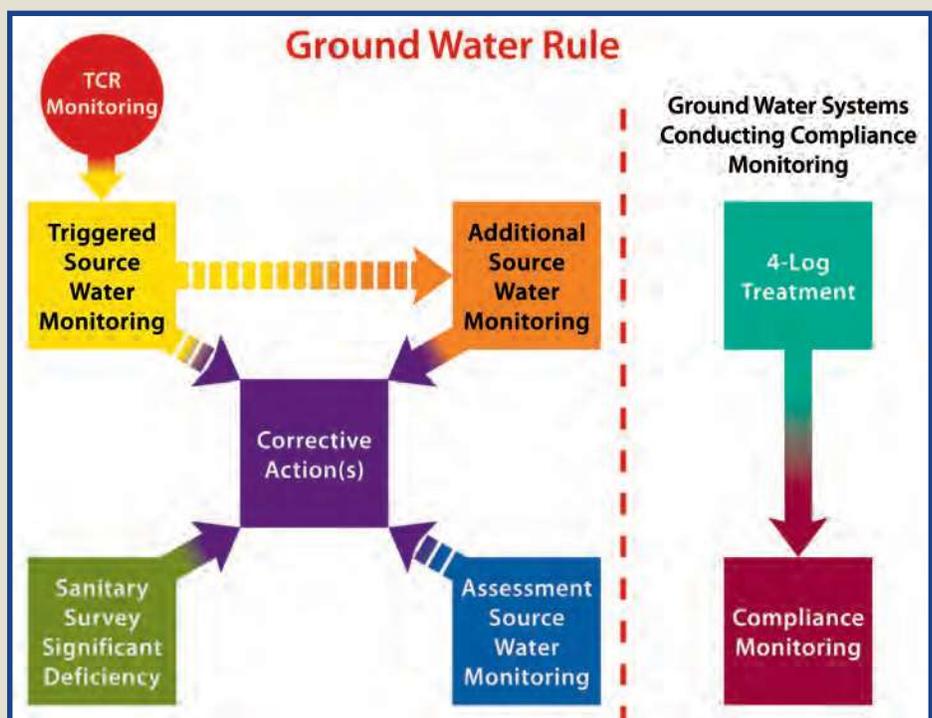
Once the Ground Water Rule takes effect, water systems could be required to collect individual water samples from each well. I suggest that if a water system does not already have individual sample taps on each well, then taps should be installed. KDHE's Minimum Design Standards require all new wells be equipped with sample taps upstream of any treatment so raw water samples can be collected. Such sample taps should not be located in a pit or vault. The design standards also require sample taps at least ten (10) feet downstream of any treatment (such as chlorination) in order to monitor

chlorine residuals or any other parameters necessary to ensure satisfactory treatment. Hopefully, ten (10) feet will provide sufficient distance to ensure complete mixing prior to sampling. In both cases, it is desirable to provide a valve in the sampling line so the tap can be repaired or replaced without depressurizing any portion of the system.

Compliance monitoring of chlorine residuals

Compliance monitoring is different from source water monitoring. It is basically treatment performance monitoring to confirm adequate disinfection is provided prior to the first customer. The purpose of compliance monitoring of chlorine residuals is to confirm residual concentrations are sufficient to ensure 4-log treatment. Compliance monitoring is only required of systems that notify KDHE by December 1, 2009 that they plan to provide 4-log treatment before the first customer. Compliance monitoring must also begin by this date. Compliance monitoring along with providing 4-log treatment, allows a system to avoid triggered source water monitoring if it has a coliform-positive distribution system sample.

For systems reporting 4-log treatment and serving more than 3,300 people, continuous chlorine residual monitoring will be required. The location for continuous monitoring must be approved by KDHE, but will likely be the point-of-entry. Such systems will be required to purchase, install and maintain continuous chlorine analyzers. It may be possible to use a single analyzer to monitor residuals from several wells should piping create blended water from those wells. A chart recorder must also be provided so the water system can determine the lowest residual concentration each day.



Typical costs for a continuous analyzer and chart recorder are \$4,000. If the continuous monitoring equipment fails, grab samples must be collected every four (4) hours and analyzed using an EPA-approved chlorine residual test kit until the analyzer is repaired and placed back in service.

For systems reporting 4-log treatment and serving less than 3,300 people, grab samples must be taken daily during the period of peak demand at a location approved by KDHE. Again, this will likely be the point-of-entry. **This means monitoring chlorine residuals daily at all points-of-entry.** If the residual falls below the state-determined minimum concentration, grab samples must be collected every four (4) hours and analyzed using an EPA-approved chlorine residual test kit until residuals return to the required level. Should the system not want to monitor daily using grab samples or find it inconvenient to drive to all points-of-entry daily, the continuous monitoring requirement described for systems serving more than 3,300 people can be used to achieve compliance.

KDHE will require all systems that report 4-log treatment, to record and submit the lowest chlorine residual measured each day. This data must be submitted monthly. KDHE has already developed a form entitled “Monthly Disinfection



This photo shows an example of a poorly maintained well slab. Surface water and pollutants could easily enter the well.

The purpose of compliance monitoring of chlorine residuals is to confirm residual concentrations are sufficient to ensure 4-log treatment.

Report for the Ground Water Rule” which can be used for this purpose. The form can be used to record lowest daily residuals in both the distribution system and at points-of-entry so that all residual data is on the same form. The form also has a section for reporting interruptions lasting more than 4 hours for those systems required to perform continuous monitoring. The first reports will be for the month of December 2009. These reports must

be submitted to KDHE by no later than January 10, 2010. All subsequent monthly reports must be submitted by the 10th of the month for the previous month.

What does it all mean?

In my opinion, I do not see very many Kansas ground water systems having problems with fecal contamination of their wells. There may be a few. Those systems with source water contamination need to take corrective actions. But, I don’t think this new rule will affect many Kansas ground water supplies for a variety of reasons. First, KDHE requires all public water supplies to disinfect, including ground water systems. KDHE also requires that minimum chlorine residuals be maintained in the distribution system. Consequently, triggered source water monitoring should be infrequent as many systems are already providing 4-log treatment and rarely have coliform-positive distribution system samples. Second, KDHE has stringent design standards for public water supply wells

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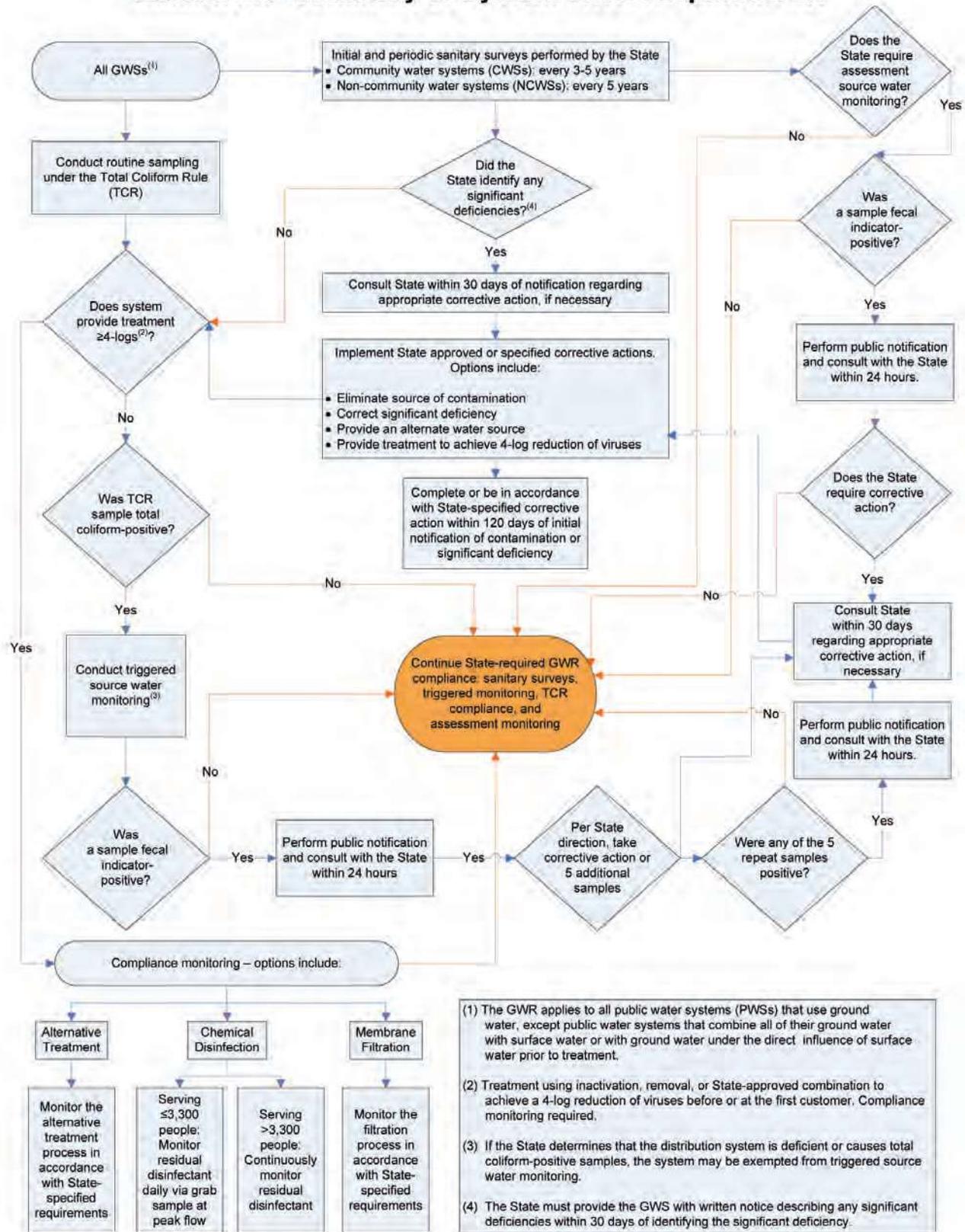
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Exhibit 2.1 Summary of System GWR Requirements



that help prevent poor construction practices that could result in contamination of wells with surface water. KDHE also has site requirements that prohibit construction of wells near major pollution sources such as feedlots or septic systems. Finally, KDHE requires all well drillers to be licensed. This also helps ensure good construction practices are followed.

Most systems that can provide 4-log treatment will report such to KDHE by December 1, 2009 and begin compliance monitoring. If a system can provide 4-log treatment, then the system avoids additional source water monitoring and possibly having to issue public notices and/or boil water advisories. It also provides some protection from triggered source water monitoring if the system sells water to other public systems.

Those water systems that cannot provide 4-log treatment have a choice to make: 1) continue to operate as in the past and conduct triggered source water monitoring should they experience a coliform-positive distribution system sample; or, 2) make improvements to their system in order to provide 4-log treatment. I don't foresee many systems upgrading to achieve 4-log treatment. Systems that cannot provide 4-log treatment should not panic. If the system has

If the system has an excellent bacteriological sampling record, properly constructed wells and does not sell water to other public systems, the impact of the Ground Water Rule should be minimal.

an excellent bacteriological sampling record, properly constructed wells and does not sell water to other public systems, the impact of the Ground Water Rule should be minimal.

The GWR can be complicated. Most systems usually have several options to consider when complying with this new rule. Should you have questions or need assistance interpreting the rule, please contact Kelly Kelsey, KDHE Public Water Supply Section in Topeka at

(785) 296-6297 or me at (913) 850-8822 or jeff@krwa.net. I would be glad to meet with any system to access their situation and provide any technical assistance that might be needed.

Jeff Lamfers began work for KRWA in November 2008. Jeff has more than 30 years of regulatory experience in the oversight and operation of water and wastewater systems with the Kansas Department of Health and Environment. He is a graduate of the University of Kansas with a degree in Environmental Studies with an emphasis in aquatic biology.



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