

# The Groundwater Rule...What it Means to You

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In addition to serving you on the OAWU board of directors, I also participate and serve on various other state and national advisory and regulatory committees and boards. For several years now Mark Snyder and I have represented OAWU on the *Oregon Drinking Water Advisory Committee*, otherwise known to many of us in the state as DWAC. The DWAC is strictly an advisory and policy setting committee, created by the Oregon Health Division, and is comprised of representatives from various organizations and groups with a specific or general interest in potable water related topics (although there is currently proposed legislation that would make DWAC an official state recognized advisory committee, stay tuned). One of the roles the members of DWAC perform is to evaluate the impact from the seemingly endless stream of new Environmental Protection Agency (EPA) regulatory rules and policies on water systems in Oregon. Recently, we have been examining several new rules, including those related to water system security, ways to fund water system improvements to comply with the never ending string of new drinking water regulations, and enhanced rules for surface water treatment, but, the just released Ground Water Rule, or GWR, is one that is sure to have some kind of impact on many OAWU members and is therefore a very timely article at this juncture.

## Background

The Ground Water Rule is one of the many outcomes from the 1996 Amendments to the 1974 Safe Drinking Water Act. The Amendments required the EPA to develop new regulations that required an adequate level of disinfection of public ground water systems to a degree “as necessary” to protect public health. Obviously, this generally wide-open term of “as necessary” provided the EPA with a great deal of latitude they could use while actually formulating and developing the proposed and final rules. Initially, the Ground Water Rule was commonly referred to as the Ground Water Disinfection Rule (GWDR), however, the term was shortened to the current version to more closely define the actual intent of the rule. The rule was

developed as the result of several ground water studies and disease outbreak data that repeatedly showed that pathogenic (harmful) viruses and bacteria can occur in public water systems that use ground water, particularly ground water delivered to consumers without treatment of any kind. Viral and/or bacterial pathogens, often found in fecal contamination from animal and human feces, can readily reach ground water, and in turn, drinking water supplies, through shallow or even deep wells via a route of inadequate or defective well depth or sanitary seals, broken or corroded well casings, wellhead flooding, failed septic systems, and/or wells constructed too close to a septic drainfield, in addition to other means. Waterborne disease caused from viral or bacterial pathogens usually results in gastrointestinal symptoms, such as diarrhea and/or vomiting, that usually does not require medical attention for healthy adults, but can be very serious, or even fatal, to high-risk groups of the population, such as young children, the elderly, and people with compromised immune systems. Although the available data does not indicate that any more than a small percentage of wells or aquifers actually have the presence of fecal contamination, the severity of the possible health impacts, and the number of affected water consumers potentially exposed to the pathogens, indicated that some type of regulatory response was needed. The GWR applies to more than 150,000 public water systems serving more than 100 million consumers in the United States and is also applicable to water systems where ground water supplies are mixed with surface water supplies in which the ground water system is not treated to the same level as the surface water supply. The rule was originally proposed by the EPA on May 10, 2000 and underwent several cycles of revisions and comments before it was signed into law on October 11, 2006. The final rule was published in the Federal Register on November 8, 2006 and became effective on January 8, 2007.

## The Science of the GWR

A basic understanding of the Ground Water Rule requires some discussion of the science and logic behind the reasons for the rule. As previously indicated, the GWR has been promulgated to provide for an increased level of front-line protection against viral and bacterial pathogens in public water systems that use ground water. Specifically, the EPA is concerned with ground

water systems that are exposed or susceptible to fecal contamination because these systems are known to be at a far greater risk of passing harmful pathogens into a water supply. Several viral pathogens are known to exist in ground water aquifers, such as Hepatitis A and E, Coxsackie viruses, Echovirus, and the currently popular viral strain of Noroviruses, while bacterial pathogens found in ground water include the well-known strain of *Escherichia coli* (*E. coli*), in addition to other lesser-known bacterial pathogens such as *Salmonella* and *Shigella*. Due to the documented relationship between the possible coincidental presence of fecal contamination and pathogenic viruses and/or bacteria in a water supply, and the fact that presumptive and rapid laboratory tests for viruses are not readily available, the EPA has established the presence of fecal contamination in a ground water supply as the prime indicator for the possible presence of pathogenic viruses or bacteria. In addition, under the Ground Water Rule, fecal contamination is now presumed to be present when one or more specific fecal indicators in the water are present. The three fecal indicators that have been selected for use in the Ground Water Rule are: *E. coli*, enterococci, and coliphage. Each of these indicators can be easily detected via various analytical methods commonly available through approved testing labs. Although fecal indicators, by themselves, are not typically harmful when ingested, their presence in ground water is now regarded as a presumptive indication that fecal contamination is also present, which, in turn, provides a strong indication that viral and/or bacterial pathogens, or at the very least, a pathway for these pathogens, may also be present into the ground water supply. This, in a nutshell, forms the basis of the science of the Ground Water Rule.

### So, What Now?

OK, so now, you have a basic understanding of what is used to indicate a possible source contamination, but where do we go now? In order to identify ground water systems at risk to fecal contamination, the EPA has established what they call a “risk-targeted” approach to identify these systems. The risk-targeted approach relies on and evaluates four major components:

- 1) Periodic Sanitary Surveys of ground water systems that require the evaluation of eight

critical water system elements: 1. source, 2. treatment, 3. distribution system, 4. finished water storage, 5. pumps, pump facilities, and controls, 6. monitoring, reporting, and data collection, 7. system management and operation, and 8. operator compliance with state requirements. States have until December 31, 2012 to complete the initial sanitary survey cycle for community water systems and until December 31, 2014 for all non-community water systems and systems that already meet the performance criteria. The sanitary surveys will be used to identify water systems with significant deficiencies or systems that already have source water problems;

- 2) Source water monitoring that is triggered when a water system identifies a confirmed positive coliform sample during its routine Total Coliform Rule monitoring as well as state optional assessment monitoring at high risk systems;
- 3) Corrective action is required when a water system is identified to have a significant deficiency or source water contamination, and;
- 4) Compliance monitoring to ensure that an adequate level of treatment is provided to reliably treat drinking water to achieve at least 99.99% (4-log) inactivation or removal of viruses.

The average cost to implement the GWR is projected to be less than \$5.00 per year for 90% of the U.S. households served by public ground water systems. Over \$3.6 billion dollars has been earmarked to ensure that drinking water systems comply with the Safe Drinking Water Act. Much of these funds are already available and used for low-interest loans to qualified water systems, including Oregon.

### What Has This Got to Do With Us?

Now that you have a basic understanding of the new Ground Water Rule, the most obvious question you may ask is: “Great, Ed, but what does all of this have to do with me, especially so soon?”. The simple answer is plenty! All you have to do is go back and look at the list of eight items that will be evaluated during the sanitary surveys. Beginning at

number one, the source, to pumps, and then, finally through the water system monitoring, many ground water systems will need to improve, or in many cases, even completely rebuild their systems in order to comply with the rule. As with so many other aspects of life and our business, it basically all comes down to money. Even though compliance with the rule will not be too expensive or require substantial improvements in some cases, in many other cases, the expense to implement the needed level of full-scale or massive water disinfection and/or a treatment system will be prohibitive. Innovative ways of new well construction, rehabilitation, or water treatment will need to be identified and created for many of these water systems. New and different aquifers will need to be identified and drilled into, old wells will need to be redrilled or deepened, new wells will need to be situated away from sources of contamination and drilled, sanitary seals, casings, and screens will need to be modified or reset at a different depth, pumping heads will increase in many instances, requiring pumps to be changed out, and new water treatment systems will be required, the list is endless. As of this month, we now have slightly less than six years for the states to complete the initial surveys for the community water systems and eight years for the non-community systems. That is not a great deal of time considering all of the work to be done. Don't wait for the state to do their work, the time to start is now! I highly recommend that ground water, or ground water under the influence of surface water (GWUI), systems start evaluating your water system for deficiencies. Look back on your coliform history and source water assessment analysis and do your own inspection of your water system. Consultation with experienced engineers, professional well drillers, and hydrogeologists can assist you with examining your existing wells and treatment systems and what will be needed to bring them into compliance with the rule. If new wells are needed, start looking for the new sites where they can be drilled. In many cases, it may take years to save enough money to simply buy the land needed for the new well, much less drill and develop the well itself. If additional treatment is indicated, start on the prerequisite pilot studies or testing. Given the current competition for undeveloped sites in many locations, the hunt for and securing of possible new well and/or treatment sites could be as much of a challenge as treating the water itself. New treatment systems may need discharge outlets for waste and

backwash water, do you already have that? In any event, start to examine the impact on your capitol and operational budgets and begin considering funding sources so the cost isn't a sudden surprise to you, or your board. The main thing is to not put your head in the sand and hope the rule will simply go away, because we all know it won't. Use the time and resources you have available to your best advantage. When it comes down to it, it's always up to us, anyway, isn't it?