NATIONAL RURAL WATER ASSOCIATION

A Compliance Guide
for Helping the Nations
Small and Rural Water Utilities

National Rural Water Association
Groundwater Rule Compliance Guide

- *Rule Summary and Requirements*
- *NRWA Spreadsheet for Calculating 4 log Removal*
- *NRWA Template for Completing a Hydrogeologic Sensitivity Analysis*

June 3, 2007

National Rural Water Association
Groundwater Rule Compliance Guide
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Introduction

There are several components to the groundwater rule that applies to all community water systems (CWS) and non-community water systems (NCWS). They include determining the sensitivity of your groundwater system; additional monitoring for total coliform positive samples; correcting significant deficiencies identified in your sanitary survey; and a requirement to take corrective actions after certain triggers are exceeded. The flow diagram shown on page 2 is a simple way to understand the requirements of the rule for systems that do not meet 4 log removal. Systems who do meet 4 log removal are only subject to the compliance monitoring and sanitary survey components of the rule that are both described below.

Rule Requirements

I. Determining if your Groundwater System is Vulnerable (or sensitive)

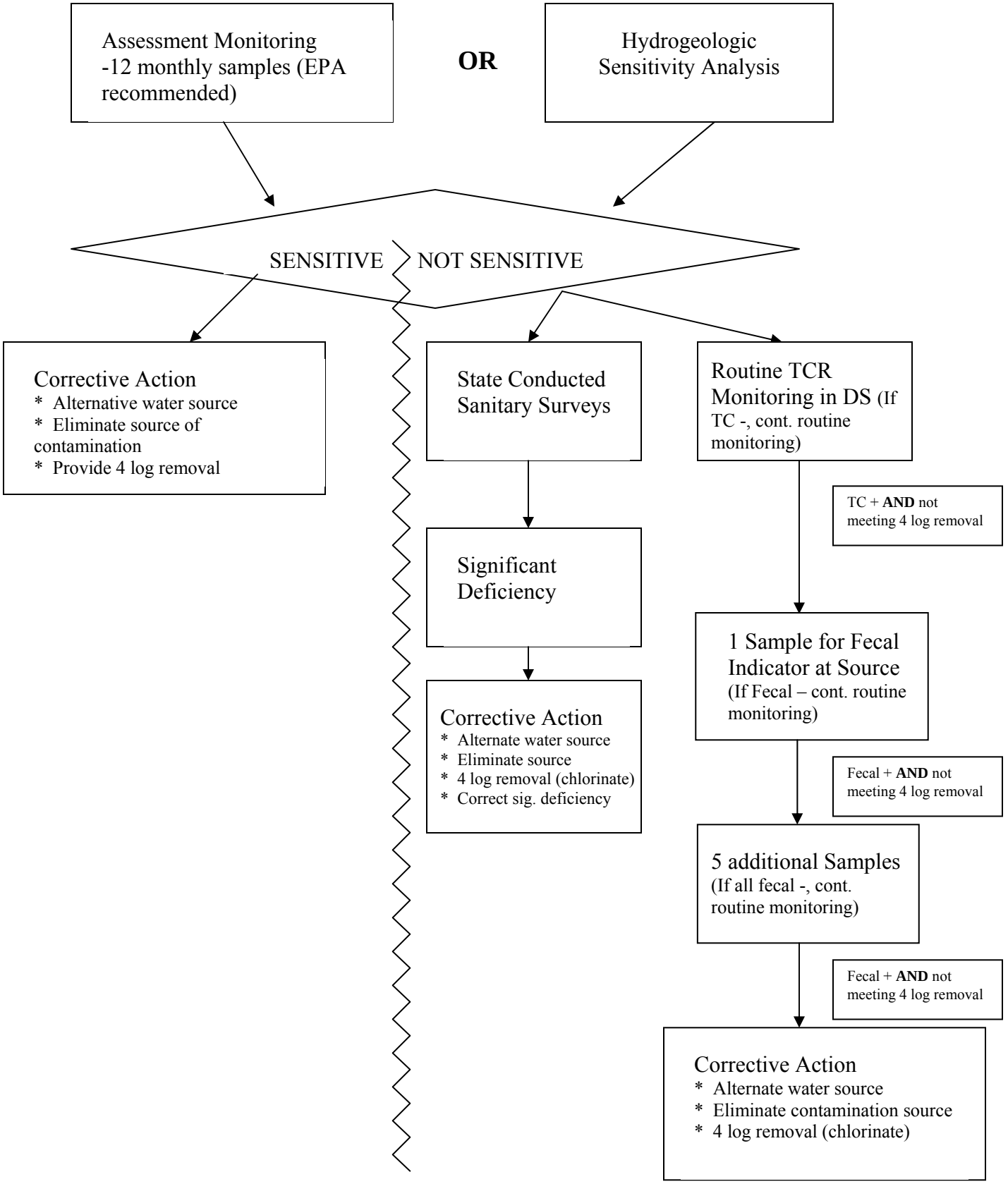
The groundwater rule requires an initial process to determine if a groundwater system is potentially vulnerable to viral or bacterial contamination. The utility can assess their vulnerability by doing "assessment monitoring" or conducting a "hydrogeologic sensitivity analysis" using the National Rural Water (NRWA) Model. Each of these options are described below:

- *NRWA HSA Model* – The model is a simple tool that can be used by the utility to justify to the state primacy agency that they do not need to conduct expensive assessment monitoring - assuming the model results in a non-sensitive assessment. The document is simple and fully self-explanatory (included as Appendix B). It should be noted that if the model indicates that you are potentially sensitive you can either do the assessment monitoring or take corrective action.

- *Assessment Monitoring* – EPA recommends for utilities to collect 12 samples (1 per month for a year) for *E. coli*, enterococci, or coliphage (a monitoring schedule and fecal indicator will be recommended by the state primacy agency). The state primacy agency has the responsibility to determine if the sample results require corrective action.

If the system is determined to be vulnerable (or sensitive to contamination) using either of the above methods, then they must take corrective action. Corrective action can be as simple as eliminating the source of contamination, or involve more expensive alternatives such as providing a different source of water or install treatment (such as chlorination) to reach 4 log removal.

Groundwater Rule
Applies to All Groundwater Systems (CWS and NCWS)
For Systems Who DO NOT Meet 4 Log Removal*



*The groundwater rule provides the state primacy agencies with flexibility to determine vulnerability by using the HSA. This was provided in the rule to prevent utilities from conducting costly assessment monitoring. In some cases when vulnerability is questionable states may require some of the assessment monitoring to validate the conclusions of the HSA.

II. Routine Total Coliform Rule Monitoring for Systems not Meeting 4 log Removal

The groundwater rule does not change the requirements to collect total coliform samples. However it does add an additional monitoring requirement if the system obtains a positive total coliform result AND if the system does not treat to 4 log removal of virus. (NOTE: false positive total coliform samples are not unusual. All utilities should recognize that there are alternatives to verify false positives and avoid public notice if there is no public health implication – See Section IV below)

Systems who are not achieving 4 log removal and with a sample with a total coliform positive, must collect a sample at the source for one of three fecal indicators (E. coli, enterococci, or coliphage). If the sample is fecal indicator positive, then the system must notify the public within 24 hours AND collect 5 additional samples from the source for the same fecal indicator within 24 hours. If any of the 5 samples are positive then corrective action is required and it is a violation of the rule. The public must be notified of the violation within 30 days.

III. Compliance Monitoring for Systems who are Meeting 4 log Removal

All groundwater systems that are disinfecting, using membranes or other alternatives to meet 4 log removal of viruses must conduct compliance monitoring. The monitoring is based on the size of the system and on the type of treatment.

Ground water systems using chemical disinfection must monitor the residual. Systems serving more than 3,300 people must install continuous monitoring equipment and record the lowest concentration each day. While systems serving less than 3,300 people are required to take a daily sample for disinfectant residual during peak flow.

If the recorded results fall below the state specified residual level (e.g. typically chlorine is required to be at a minimum residual of 0.2 mg/l at the entrance to the distribution system), then the utility must correct the problem within 4 hours of discovering the residual is too low. Systems should contact their state rural water association for assistance if needed to help identify and repair the problem. If it takes more than 4 hours to fix the problem, systems must contact the state primacy agency and will be in violation of the rule. If the residual continuous monitoring equipment fails, then grab samples must be collected every 4 hours and be returned to operational status within 14 days.

Groundwater systems using membrane filtration to meet 4 log removal and must ensure that:

1. The membrane has an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses;

2. The membrane process is operated in accordance with State-specified compliance requirements; and
3. The integrity of the membrane is intact.

Groundwater systems can also use other state approved methods to meet 4 log removal and are evaluated on a case-by-case basis.

IV. What Every System Should Know About Positive Coliform Samples. Many times samples are contaminated or reported positive due to laboratory error or contamination during sample collection. There are so many potential ways to contaminate a sample that every effort must be made to ensure the utility is truly serving water that is negatively impacting public health. States have many tools available to them to investigate the confidence in the sample if it is truly impacting public health.

V. State Conducted Sanitary Surveys

State primacy agencies are required to conduct sanitary surveys of all CWS every 3 years and all NCWS every 5 years. The groundwater rule adds a new requirement to the sanitary survey mandating that any system with a "significant deficiency" must take corrective action within 120 days (NOTE: State primacy agencies can set a schedule for the completion of the correction of the significant deficiency. This may be longer than 120 days for a severe heath threat and can be longer than 120 days if not an immediate threat to public health but may include interim milestones. Any significant deficiency identified by the state in the sanitary survey must be communicated with the public within 30 days.

This component of the groundwater rule will be the most subjective and debated component. Each state and each person within a state will interpret the regulation differently. An individual conducting a sanitary survey may recognize certain conditions as significant deficiencies but may be noted as a minor deficiency by others. This subjectivity may cause much consternation in the water utility industry. Utilities are encouraged to work with their State Rural Water Associations if they believe items in their sanitary survey are being unfairly articulated or unfairly defined as significant public health risks.

If the state determines your utility has significant deficiencies you must do public notification and take corrective action. The corrective action can be simple or complex but it is up to the utility what corrective action is the most affordable and in the community's best interest. The groundwater rule list 4 corrective actions including: Correcting the significant deficiency(s), providing an alternative source of drinking water, eliminating the source of contamination, or installing treatment to

obtain 4 log removal of viruses (e.g. chlorination). A spreadsheet that can be used to determine if your system meets 4 log removal of viruses is provided in Appendix A.

VI. Determining if your system meets 4 log removal of Viruses

In some cases discussed above, groundwater systems must achieve 4-log removal/inactivation of viruses; i.e. 99.99% removal/inactivation. Removal/inactivation occurs through filtration and/or disinfection. Achieving this level of treatment may or may not be difficult depending on the unique conditions of the system; i.e. storage time, water temperature, peak flow and chlorine concentration. Inactivation is a function of the disinfectant concentration and the amount of time the water spends in contact with the disinfectant before the first service connection. The spreadsheet in Appendix A provides the calculations needed to determine if your system can achieve 4-log removal.

VII. When do all of the new requirements have to be completed?

- The utility must complete the HSA or notify the state that they will be collecting samples for assessment monitoring by December 1, 2009. However rural water is encouraging utilities to complete the HSA as soon as possible so that they can budget for any treatment or operating changes that may be anticipated.
- Notify the State that the system is achieving 4 log removal and will be collecting compliance monitoring samples must be completed by December 1, 2009.
- The new routine monitoring for fecal indicators when a total coliform positive sample is detected take effect December 1, 2009.
- The requirement to take corrective actions for state conducted sanitary survey take effect December 1, 2009.
- The new public notice requirements take effect December 1, 2009

Appendix A

National Rural Water Association
Spreadsheet to Calculate 4 Log Removal

Groundwater Rule Update: 4-Log Removal Calculation Demonstration

In some cases discussed above, groundwater systems must achieve 4-log removal/inactivation of viruses; i.e. 99.99% removal/inactivation. Removal/inactivation occurs through filtration and/or disinfection. Achieving this level of treatment may or may not be difficult depending on the unique conditions of the system; i.e. storage time, water temperature, peak flow and chlorine concentration. Inactivation is a function of the disinfectant concentration and the amount of time the water spends in contact with the disinfectant before the first service connection. The following spreadsheet provides the calculations needed to determine if your system can achieve 4-log removal. The example is a hypothetical groundwater system with a 6 inch main, no tank storage and 1,500 feet before the first service connection (storage volume based on the volume of 1,500 feet of 6 inch pipe). The example shows 4-log is achieved for the conditions indicated. Contact time is a function of the system's storage volume (in tanks and/or distribution system prior to the first service connection) and peak hourly flow. The spreadsheet (activate by double clicking within the table) can be used by entering a system's unique parameters; see instructions below. Chlorine, pH, temperature and peak flow are normal system measured values while storage volume has to be calculated if not already known. This will allow you to see what chlorine concentrations and storage times are needed for your particular system.

Example 4 log Calculation

Baffling Factor 1

Baffling Factor

1	2	3	4	5	6	7	8	9	10	11
Cl Conc	**pH**	**Temp**	**Peak Flow**	**Storage**	**Total Detention**	**Contact time**	**CT calc**	**CT req**	**Inactivation ratio**	**Log removal**
mg/L		^{o}C	GPM	**Volume**	**Time (TDT)**	min	Cl Conc x	table B2	CT calc/CT req	4 X Inactivation Ratio
				Gallons	Vol/Peak Flow	TDT x Baffling Factor	Contact Time			
1.5	7	10	500	2202	4.40	4.40	6.61	6	1.10	4.40

Has to be 4 or above

Table 4-2
Baffling Factors

Factor	Description
0.1	None, agitated basin, very low length to width ratio, high inlet/outlet velocities
0.3	Single or mutliple unbaffled inlets or outlets, no intra-basin baffles
0.5	Baffled inlet/outlet with some intra-basin baffling
0.7	Perforated inlet baffle, serpentine or perforated intra-basin baffles, outlet weir or perforated launders
1	Very high length to width ratio (pipeline flow) perforated inlet, outlet and intra-basin baffles

TABLE B-2
CT VALUES* FOR
4- LOG INACTIVATION OF VIRUSES BY FREE CHLORINE

Temperature (^{o}C)	pH	
	6-9	10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Example 4 log Calculation Instructions

Column Number	Instruction
Baffling Factor	Choose factor from baffling factor table based on system parameters. In the example, factor is 1 because the groundwater system has no storage after disinfection other than the distribution system; flow is pipe flow. The EPA charts can be found at: http://www.epa.gov/safewater/mdbp/pdf/profile/lt1profiling.pdf, pages 31-32.
1	Enter the free chlorine concentration during peak hourly flow in mg/L
2	Enter the pH during peak hourly flow.
3	Enter the water temperature during peak hourly flow in degrees Centigrade.
4	Enter the peak hourly flow value in gallons per minute.
5	Enter the system storage volume after disinfection. Storage volume may be in an elevated storage tank, contact basins, distribution system piping or a combination of all of these. In the example, storage is calculated based on 1,500 feet of 6 inch pipe such that V=π(radius squared in feet)(length in feet)(7.48gal/cubic foot) = $3.14(0.25^2)(1{,}000)(7.48)$
6	Automatically calculated based on above inputs Where: Total Detention Time (min) = Storage Volume (gal) / Peak Flow (gpm)
7	Automatically calculated based on above inputs Where: Contact Time = Total Detention Time (min) x Baffling Factor
8	Automatically calculated based on above inputs Where: CT_{calc} = Concentration of Disinfectant (mg/L) x Total Detention Time (min) x Baffling Factor
9	Look up value from table B-2 based on pH and temperature as entered in columns 2 and 3; respectively. In the example the CT required is 6, pH of 7 and temperature of 10^oC. You may interpolate CT values between temperatures not listed. The EPA Tables can be located at: http://www.epa.gov/safewater/mdbp/pdf/profile/lt1profiling.pdf, Appendix B, page 104.
10	Automatically calculated based on above inputs. The 4-log Inactivation is meet when $CT_{calc} / CT_{reqd} \geq 1.0$
11	Automatically calculated based on above inputs. Note this value has to be 4 or above to meet the requirements for 4 log removal/inactivation, which in this example is 4.40 log removal.

Please note this is a simplistic example where in there is no storage other than that which is afforded by the distribution system. If a utility has an elevated storage tank, the calculations above need to be completed for the elevated storage tank as well as the distribution system. The distribution system log removal value and the elevated storage tank log removal values are added together to arrive at the total system log removal.

Likewise if the utility filters its water, an additional log removal credit is added to the calculated log removal consistent with the credits in Table 7.2 *Typical Removal Credits and Inactivation Requirements for Various Treatment Technologies*, EPA LT1 Profiling manual, page 62. http://www.epa.gov/safewater/mdbp/pdf/profile/lt1profiling.pdf

For example if a utility is filtering its groundwater via slow sand filtration, a log removal credit of 2.0 would be added to whatever the calculated value is using the above spreadsheet. So in the example shown in the spreadsheet, if the utility was using slow sand filtration, the total log removal for this example would be 4.40 (calculated above) + 2.0 (from Table 7.2) = 6.40 total log removal (well beyond the required 4 log removal).

Table 7.2: Typical Removal Credits and Inactivation Requirements for Various Treatment Technologies

Process	Typical Log Removal Credits		Resulting Disinfection Log Inactivation Requirements	
	Giardia	**Viruses**	***Giardia***	**Viruses**
Conventional Treatment	2.5	2.0	0.5	2.0
Direct Filtration	2.0	1.0	1.0	3.0
Slow Sand Filtration	2.0	2.0	1.0	2.0
Diatomaceous Earth Filtration	2.0	1.0	1.0	3.0
Alternative (membranes, bag filters, cartridges)	*	*	*	*
Unfiltered	0	0	3.0	4.0

* Systems must demonstrate to the State by pilot study or other means that the alternative filtration technology provides the required log removal and inactivation shown in Table 7-1.

Appendix B

National Rural Water Association
Hydrogeologic Sensitivity Analysis

National Rural Water Association
Hydrogeologic Sensitivity Analysis Model

June 3, 2007

Introduction

The NRWA Hydrogeologic Sensitivity Assessment (HSA) Model was developed through a collaborative effort of Florida Rural Water Association, Kentucky Rural Water Association and National Rural Water Association. The objective is to provide groundwater systems NOT under the direct influence of surface water a means to assess their system. If the HSA indicates the system is not sensitive to bacterial and viral contamination then systems will not be subject to costly assessment monitoring required by the Groundwater Rule.

Many groundwater systems have operated effectively with no public health concerns for years. In many states disinfection has been required for groundwater systems while in others no such requirement has been in practice. Either way all public water systems have to perform routine coliform monitoring as required by the Total Coliform Rule. As a result, most groundwater systems have been identified that have issues with microbial contamination. Groundwater systems that complete this tool will be able to demonstrate to the state primacy agency that the utility is or is not sensitive to microbial contamination. If it is determined that you are considered "not sensitive" you will only be subject to the "compliance monitoring" and "sanitary survey" components of the groundwater rule. Each of those requirements are described in the "NRWA Groundwater Rule Compliance Guide". (NOTE: State primacy agencies have the flexibility to determine vulnerability by using the HSA. This was provided in the rule to prevent utilities from conducting costly assessment monitoring. In some cases when vulnerability is questionable the state primacy agency may require some of the assessment monitoring to validate the conclusions of the HSA).

Answering yes to any of the first six questions is indicative that a system is not sensitive to microbial contamination nor is it operating in a manner that may jeopardize public health. If you answer yes to any of these questions you are considered "not sensitive" and should be exempt from the "assessment monitoring" required in the groundwater rule. Question 7 focuses on proper operations, management and other existing regulatory initiatives that when considered collectively, are indicative that a system is not sensitive to microbial contamination nor are there public health concerns associated with the water produced by the system. Question 7 consists of a series of questions each with a scoring factor. A total score greater than 0 for question 7 indicates the system is "not sensitive".

National Rural Water Association
Hydrogeologic Sensitivity Assessment Model

QUESTION	ANSWER	COMMENT	EXPLANATION
1. Can your system demonstrate 4-log removal/inactivation of viruses via disinfection and filtration?	☐ Yes ☐ No	Not all states require disinfection for groundwater systems. However, many systems may provide disinfection as a public health safeguard. If so you can calculate your removal/inactivation of bacteria and viruses. If you are able to demonstrate 4-log removal/inactivation you are considered "not sensitive". Note: Log removal credits are available for filtration that can be applied to the required 4-log removal requirement for viruses. Check with your state regulatory agency for the credits available for your filtration train. Appendix A contains forms and instructions on how to calculate your log removal.	
2. Can the system demonstrate that there are no sources of microbial contamination within 180 day time of travel in relation to groundwater flow direction and is the system able to influence/control the activities within the geographic area corresponding to 180 day time of travel?	☐ Yes ☐ No	EPA studies have shown that viruses are viable in the environment for a greater period than fecal bacterium. These studies have shown that after 180 days viruses associated microbial contamination of groundwater sources do not survive. The Groundwater Rule emphasizes sensitive systems as a reason for regulating groundwater systems. If there are no sources of microbial contamination within 180 days time of travel, your system is considered "not sensitive". The distance corresponding to 180 day time of travel may only be several hundred feet in consolidated geological features thus making it	

		easy to identify microbial contamination sources and changes in land use. This may also be the case in the karst, fractured bedrock and gravel hydrogeologies in areas where a system owns a considerable watershed area. However in most karst, fractured bedrock and gravel hydrogeologies, the distances corresponding to 180 days time of travel could be in the order of several miles. This distance may not allow a small system to identify, have control over nor manage the potential microbial contamination sources.	
3. Have monthly total coliform sample results during the previous 12 months indicated no coliform presence?	☐ Yes ☐ No	Total coliform has long been used as an indicator of fecal contamination. Public health impacts are centered on pathogenic bacteria and viruses. Pathogenic bacteria from fecal sources will not be present if total coliform analyses are negative. Therefore if 12 months of sample data indicates your system has been total coliform negative, it is likely your system is not subject to microbial contamination and is not a sensitive system under the Groundwater Rule.	
4. If total coliforms were detected were any samples positive for fecal coliforms?	☐ Yes ☐ No ☐ NA	If yes then your system MAY be sensitive. If the samples was invalidated due to lab error or contamination then you are considered “not sensitive”. If no you are likely considered “not sensitive”. Bacteria other than fecal related bacteria can produce a positive result for total coliforms. Standard laboratory methodology requires if a total coliform analysis is positive, the lab must then measure for fecal coliforms. If the fecal analysis is negative there are no fecal related bacteria.	

5. Are the system's wells located in any geological formation <u>other than</u> karst, fractured bedrock or gravel geology?	☐ Yes ☐ No	If yes you are considered "not sensitive" If no your system <u>may be considered</u> sensitive by the Groundwater Rule EPA believes karst, fractured bedrock and gravel hydrogeology [defined by EPA in the rule as deposits of unconsolidated gravel, cobbles, and boulders – material larger in size than pebbles (alluvial formations are not included in the definition)] to be sensitive to microbial contamination due to the relatively large grain size of these formations which aids in rapid vertical and horizontal water movement. These formations, unlike more consolidated features, are believed by EPA not to afford natural filtering capabilities thus microbial contaminants can travel long distances in a relatively short period.	
6. If the system's wells are located in karst, fractured bedrock or gravel geology, is there a confining layer or other barrier to prevent microbial contamination?	☐ Yes ☐ No ☐ NA	If yes you are considered "not sensitive". EPA recognizes that hydrogeologic barriers if present in a karst, fractured bedrock or gravel hydrogeologic formation, can negate finding that such geologies are sensitive to microbial contamination. An example of an hydrogeologic confining layer that may be considered acceptable is a clay lens. EPA indicates in addition to physical barriers, chemical and biological factors preventing the movement of microbial contamination to a well can be considered barriers.	

QUESTION	**ANSWER**	**SCORE**	**COMMENT**	**EXPLANATION**
7. The following questions are designed to determine if your system is sensitive to microbial contamination. Each question has a weighting factor corresponding to the question's relevancy with respect to gauging sensitivity. If a system's score is greater than 0 from a possible –17 to +20 it is "not sensitive" to microbial contamination.				

7a. Has your state regulatory agency determined that your aquifer is not sensitive to microbial contamination via a source water assessment or wellhead protection plan (WHP)?	☐ Yes = +3 ☐ No = -3		EPA recognizes that information obtained via the source water assessment will be useful in determining if a system is sensitive to microbial contamination. If your state has declared through the assessment or WHP programs that you are not sensitive, this will be important in determining sensitivity under the Groundwater Rule. Conversely, if your state has determined your system is sensitive or has not made a determination, this counts against your system.	
7b. Has the system completed groundwater modeling to determine time of travel for its aquifer?	☐ Yes = +3 ☐ No = 0			
7c. Has the system determined if there are microbial contaminant sources within 180 days time of travel?	☐ Yes = +3 ☐ No = -3		As indicated in question 2, 180 days is the outer survival time for viruses of concern to public water systems. If a system has modeled its aquifer determining time of travel and can demonstrate microbial sources are outside the 180 days time of travel, this information will strengthen a system's defense that they are not sensitive to microbial contamination. This information can also be used to support a multi-barrier approach. Conversely if the system has not modeled its aquifer, it has no idea if microbial contamination sources are a threat and as such, a no answer to this question counts against the system.	
7d. Has your state regulatory agency determined that your system is not under the direct	☐ Yes = +2		Microbial contamination can come from multiple sources including surface water intrusion. UDI determination should have	

influence (UDI) of surface waters?	☐ No = -2		been made at the time of the Surface Water Treatment Rule. If your system has been determined not to be UDI then it is likely you are not in a sensitive geology.	
7e. If your state has not made a UDI determination, have you been successful in demonstrating to your state regulatory agency that your system is not UDI; i.e. the state has accepted your analysis?	☐ NA = 0 ☐ Yes = +2 ☐ No = -2		Likewise if you were able to demonstrate you are not UDI for example if correcting well head deficiencies corrected surface water intrusions that made it appear your aquifer was UDI and the state has accepted it, then you are likely not in a sensitive geology. Tests such as Microscopic Particulate Analysis (MPA) can determine if your system is UDI. If UDI, the MPA test will show common surface water organisms such as rotifers and algae.	
7f. Are your wells in compliance with state/local set back distances for microbial contamination?	☐ Yes = +1 ☐ No = -1		Set back standards for microbial contamination are distances mandated by a state environmental or health agencies between potable water wells and septic systems, biosolids application fields, sludge lagoons, etc.	
7g. Has your latest sanitary survey found that your wells are in compliance with state construction standards for potable wells?	☐ Yes = +1 ☐ No = -1		As part of the Groundwater Rule, EPA uses sanitary surveys as part of a multi-barrier approach for preventing microbial contamination. *"When properly conducted, sanitary surveys can provide important information on a water system's design and operation and can identify minor and significant deficiencies for correction before they become major problems. By taking steps to correct deficiencies exposed by a sanitary survey, the system provides an additional barrier to microbial contamination of drinking water." (EPA Proposed Groundwater Rule).*	
7h. Are your wells covered (out of the weather) and the area around the well cleaned	☐ Yes = +1		Questions 7h, 7i and 7j take into consideration information encountered by rural water field staff. Field data has shown	

regularly?	☐ No = -1		that in the majority of cases where the state, through positive fecal indicator monitoring data, has declared the system's source water to be contaminated, addressing the issues outlined in question 7h, i and j resolve the issues and the source water is not contaminated. Most often above ground well systems and a lack of or inadequate maintenance programs cause positive fecal indicator results.	
7i. Do you have an adequate maintenance program that will insure well is secured from surface contamination to include but not limited to inspecting casing cap seals, concrete pad surrounding the well, packing gland cleaned and sealed, drains cleaned, electric conduit sealed, etc?	☐ Yes = +1 ☐ No = -1			
7j. Are your wells properly vented?	☐ Yes = +1 ☐ No = -1			

7k. If deficient items were identified in the sanitary survey have they been corrected?	☐ NA = 0 ☐ Yes = +2 ☐ No = -1		Correction of deficiencies outlined in a sanitary survey will often resolve microbial issues. The Groundwater Rule will require that deficiencies be corrected or if they can't then there are several options including disinfection to 4 log removal, finding a new water source or eliminating the contamination source.	
7l. Has your system qualified for any compliance waivers from primary drinking water standards not including reduced monitoring, as a result of a vulnerability assessment?	☐ Yes = +1 ☐ No = -1		A waiver granted as a result of a vulnerability assessment may be beneficial in determining the sensitivity of an aquifer to contamination. The assessment, although likely to specific to a chemical contaminant vs. microbial contamination, may provide information about "how well the source is protected by geology and well design, Wellhead Protection Assessments, and proximity to potential contamination sites and activities." (EPA Proposed Groundwater Rule).	If yes, what is/are the waiver(s) for and why did the state grant the waiver(s)?
Question 7 Total Score				