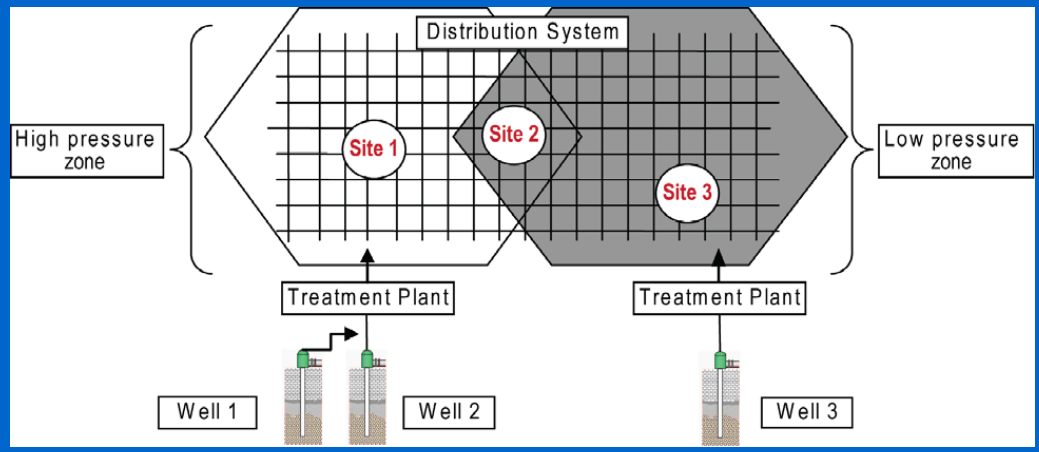
Representative Monitoring under the Groundwater Rule



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What is Triggered Monitoring?

Starting December 1, 2009, “Triggered Source Water Monitoring” will require PWS’ to test their ground water sources for a fecal indicator whenever there is a Total Coliform Rule (TCR) positive sample in distribution.

Triggered Monitoring

Systems that provide 4-log treatment of viruses and the related compliance monitoring are not subject to the triggered source water monitoring requirements of the GWR.

However, ground water sources (GWS') of systems that do not provide 4-log treatment of viruses must monitor for fecal indicators if *triggered* by a TCR-related Total Coliform (TC)-positive routine sample in the distribution system.

Triggered Monitoring

For Triggered Monitoring, a GWS will have to collect, within 24 hours (of notification) of a TC-positive sample, at least one sample from each GWS in use at the time the TC-positive routine sample was collected under the TCR, ***unless*** the system has approval from the State to conduct Representative Triggered Source Water Monitoring at a representative ground water source or sources.

Representative Triggered Source Water Monitoring Plan

- In order to gain approval from the State to conduct triggered source water monitoring at a representative GWS or sources, a PWS with more than one GWS may submit a Representative Triggered Source Water Monitoring Plan for approval to the DWS that the system will use for representative sampling.

Representative Triggered Source Water Monitoring Plan

Representative Triggered Source Water Monitoring Plans must identify GWS' that are representative of each distribution monitoring site in the system's TCR sample site plan. So, the plan will propose conducting "representative" monitoring only at those wells that accurately represent the affected distribution TCR sampling site.

**All plans must be reviewed and approved by the DWS before being applied by a PWS!*

What Should be Included in The Plan?

Triggered source water monitoring plans:

- *Map or schematic of the system, which includes the following:*
  - o *Pressure zone boundaries in the distribution system.*
  - o *TCR routine monitoring locations, clearly labeled.*
  - o *Entry points of all sources, clearly labeled, with the contributing sources clearly identified.*
  - o *Entry points and status of any interconnections to other systems.*
  - o *Storage tanks / reservoirs.*
  - o *Pressure regulation facilities (reducing stations).*
  - o *Other infrastructure that may affect pressure / flow in distribution.*
  - o *Booster pump stations.*
  - o *Critical valves.*

What Should be Included in The Plan?

Triggered source water monitoring plans, cont'd …:

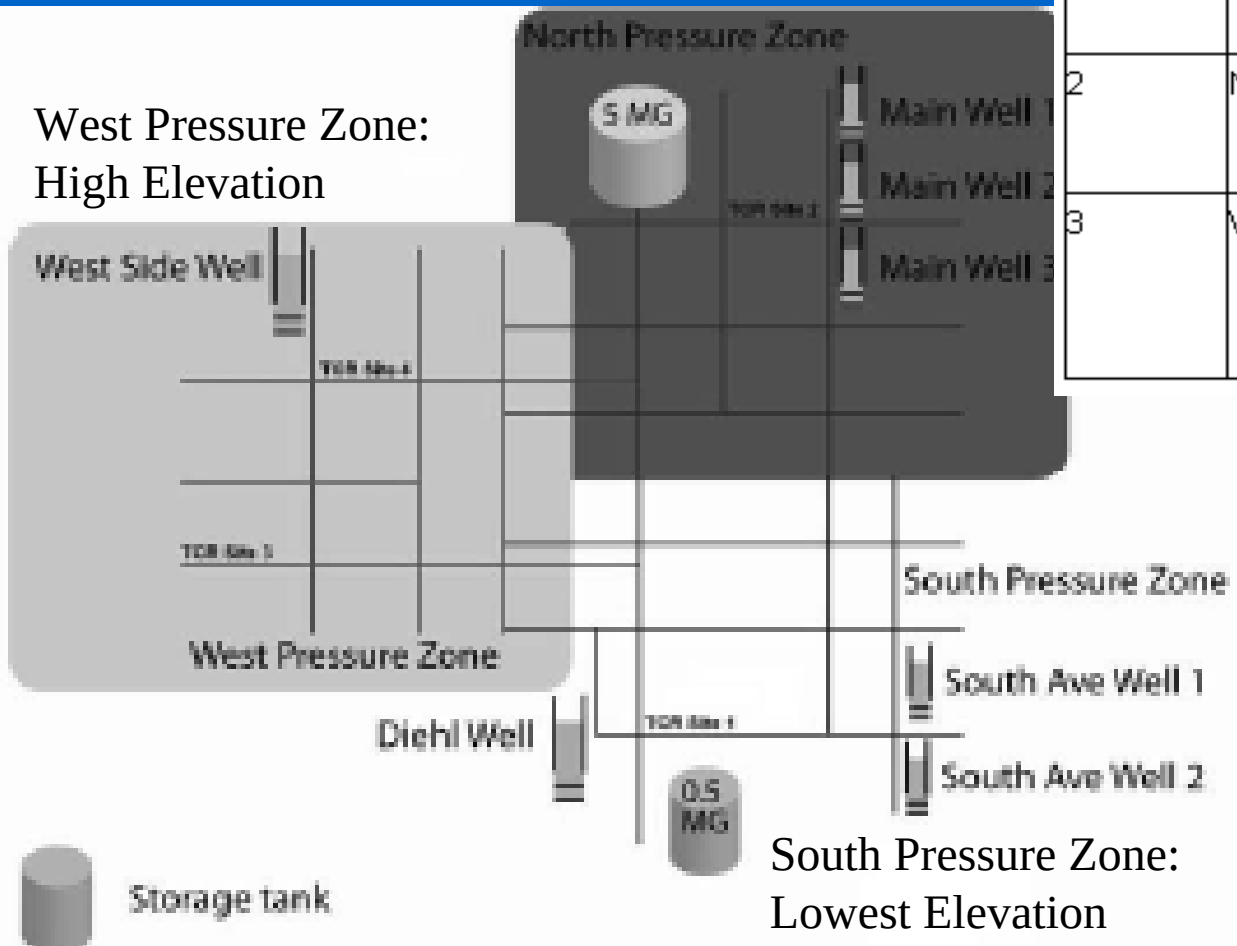
- *The source type and level of treatment provided for each source/point of entry such as whether it is seasonal, emergency, ground water, surface water, a wholesale supply, etc.*
- *The source(s) serving each TCR compliance monitoring location; and,*
- *The **basis** for the determination, such as system hydraulics, operation, water quality data, etc. (*Hydraulic modeling can be used to determine the flow path from one point to another in a distribution system and can benefit systems who have complex systems with numerous pressure zones.)*

Example A:

TCR Site	Pressure Zone	Contributing Wells
1	South	South Ave Well 1 South Ave Well 2 Diehl Drive Well Main Well 1 Main Well 1 Main Well 3 West Side Well
2	North Central	Main Well 1 Main Well 2 Main Well 3
3	West Side	Main Well 1 Main Well 2 Main Well 3 West Side Well

North Pressure Zone: Highest Elevation

West Pressure Zone: High Elevation



South Pressure Zone: Lowest Elevation

Example A:

Example A shows a simple schematic of distribution and a table identifying routine TC sample sites and sources that can supply water to each site. In this example, South Pressure Zone is at the lowest elevation; and, West Pressure Zone is at a lower elevation than North Pressure Zone. Based on hydraulic reasoning, water flows from North Pressure Zone to both the West and South Pressure Zones and water flows from West Pressure Zone to South Pressure Zone.

(*A tracer study can strengthen this determination (i.e., If tracer is introduced at the South Pressure Zone and is not detected in either the West or North Pressure Zones*.))

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Example B:

A. System Information

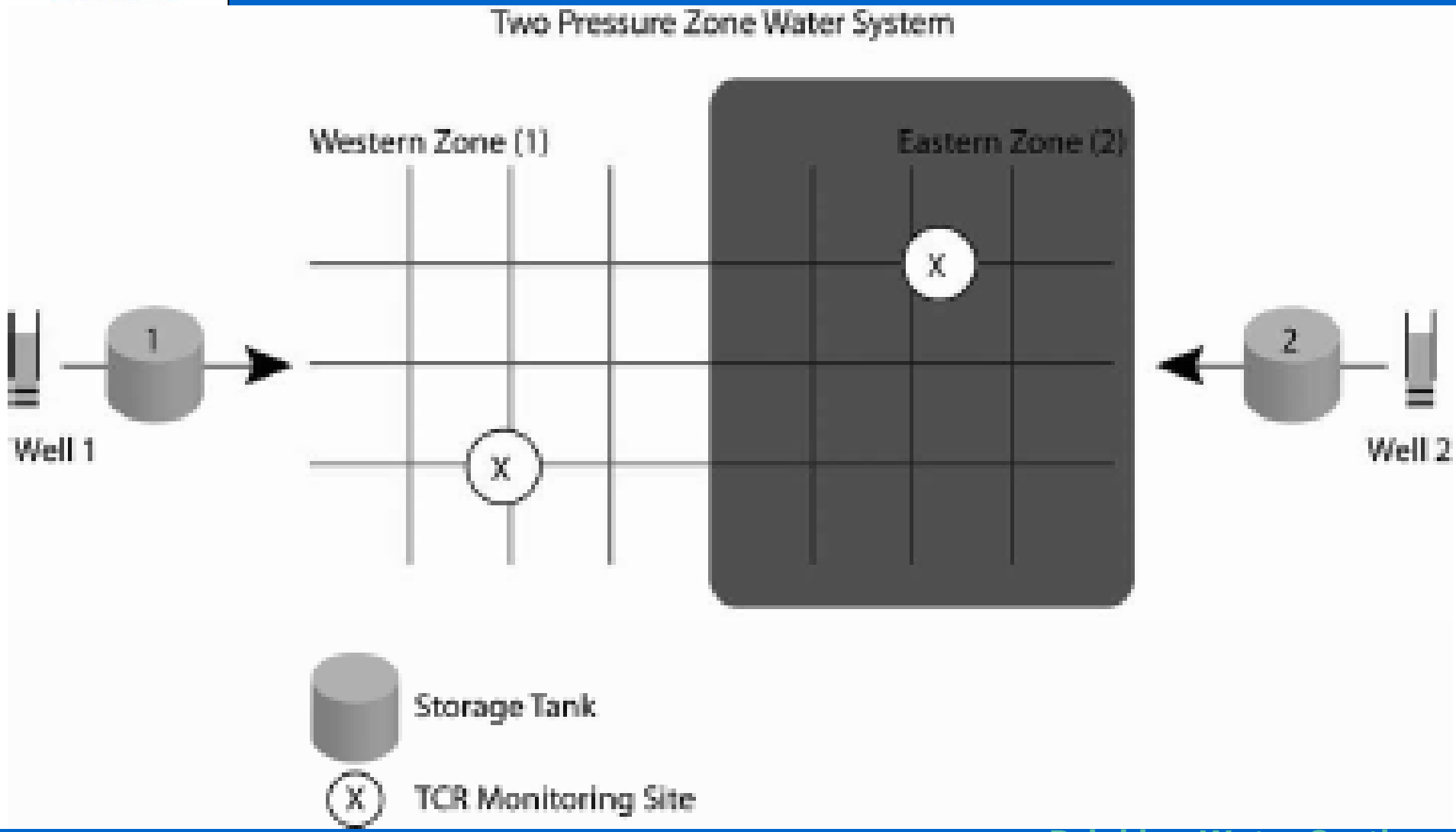
(Enter the following information about the water system.)

Water System Name:	*Good Town Water System*		
PWSID #:	*CT5555555*		
County or District:	*Good Town County*		
Ground Water Sources:	**Source Name**	**Source ID #**	**Well Depth**
	Well 1	*WL002*	*200'*
	Well 2	*WL003*	*800'*
Storage:	*2 hydropneumatic tanks - each 100 gallons*		
Treatment:	*None*		
Booster Stations:	*None*		
Pressure Reducing Stations:	*One*		
Pressure Zones:	*There are 2 pressure zones. Well 1 serves the western pressure zone (Zone 1). Well 2 can serve both pressure zones (Zone 1 or 2).*		
TCR Sample sites:	*There are 2 TCR sites. One site is in the western zone (Zone 1) and the other is in the eastern zone (Zone 2.) See map attached.*		

Population and Connections by Pressure Zone

	Population	Connections
Pressure Zone 1 - Western	*750*	*302*
Pressure Zone 2 - Eastern	*1085*	*452*
Total Pop & Connections :	*1835*	*754*

Example B:


Two Pressure Zone Water System
Western Zone (1)
Eastern Zone (2)
1
2
Well 1
Well 2
Storage Tank
TCR Monitoring Site

Example B:

C. Wells Representative of Each TCR Site

(Provide the following information on the system's TCR sites and how it was determined which source provides the water to that site.)

Tools used to identify well that contribute to TCR sites	Explanation of how tool was used for identification
Distribution system maps:	*Our system has two pressure zones. The western zone is a lower elevation and is generally fed by Well 1 although during high demand, it is also fed by Well 2. The eastern zone is fed by Well 2 only.*
Coliform Monitoring Plan:	*Our plan identifies primary TCR sampling sites as well as upstream and downstream sites that are sampled in the event of a TC+ sample.*
Distribution system hydraulic models:	*Not used.*
Water quality parameters:	*Not used.*
Other:	*Under normal operating conditions Well 1 is sufficient to serve the western pressure zone (Zone 1), and Well 2 serves the eastern zone (Zone 2). However, during the high demand experienced during summer months (May through September), Well 1 does not have enough capacity to meet the demand in Zone 1. When pressures in Zone 1 drop to 35 psi, water is fed from the eastern zone in the western zone through a pressure reducing valve located at a valve vault near the intersection of Main and Elm Streets.*

Example B:

TCR Site	Zone	Sources Contributing to this TCR Site	Contributing Sources Representative of Each Other	Representative Source to Sample (Triggered)	Seasonal Considerations
1	Western (Zone 1)	Wells 1 & 2		Wells 1 & 2	Well 2 only serves this site during high demand (when pressures drop below 35 psi). This is typically in the months of May through September.
2	Eastern (Zone 2)	Well 2		Well 2	n/a

Example C:

A. System Information

(Enter the following information about the water system.)

Water System Name: *Valley View Water System*

PWSID #: *CT5555555*

County or District: *Greene County*

Ground Water Sources:

Source Name	Source ID #	Well Depth
Valley View Well	*WL001*	*125'*
Emergency Well	*WL002*	*65'*

Storage: *(1) 200,000-gallon ground level storage tank located adjacent to our upland reservoir and its treatment plant. The storage tank only contains treated surface water and feeds the distribution system by gravity flow.*

Treatment: *None (for groundwater): Surface water receives conventional treatment.*

Booster Stations: *None; but chlorine is injected into water leaving storage tank.*

Pressure Reducing Stations: *None*

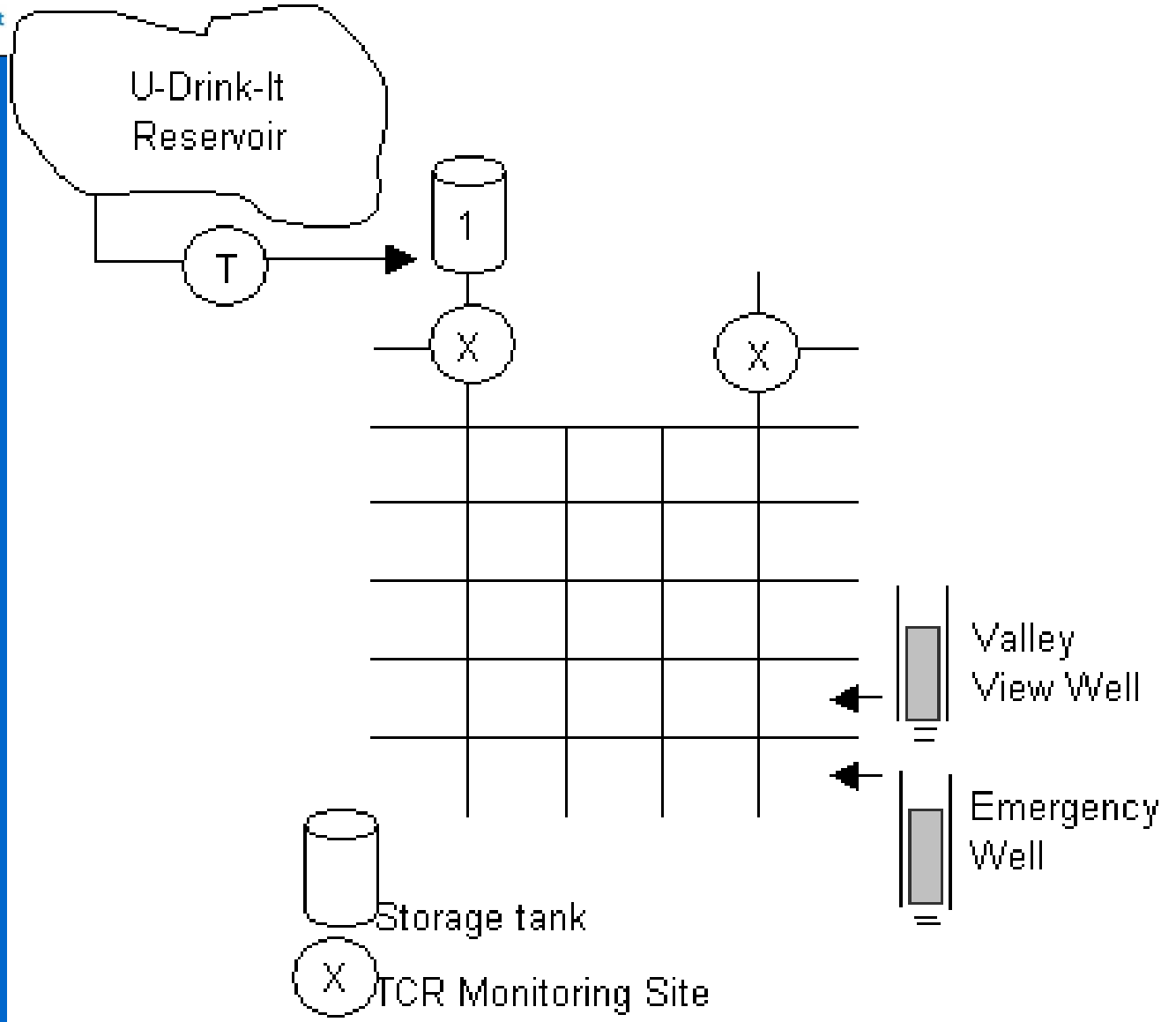
Pressure Zones: *There is one pressure zone. High pressure flows form the storage tank, but it does not maintain enough pressure to safely supply the easternmost part of the system. Our well (WL001) in the valley provides approximately 12,000 gpd to the eastern part of the distribution system.*

TCR Sample sites: *2 coliform samples are collected each month: Sample Site 1 is located in the northwest quadrant of the distribution system, which is served exclusively by water leaving the storage tank; Sample Site 2 is located in the northeastern corner of the distribution system where there are issues maintaining sufficient pressure. Sample Site 2 receives water from both the surface water treatment plant and the well.*

Population and Connections by Pressure Zone

	Population	Connections
Valley View Water System	*2420*	*980*

Example C:


U-Drink-It Reservoir
T
1
X
X
Valley View Well
Emergency Well
Storage tank
X
TCR Monitoring Site

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Example C:

C. Wells Representative of Each TCR Site

(Provide the following information on the system's TCR sites and how it was determined which source provides the water to that site.)

Tools used to identify well that contribute to TCR sites	Explanation of how tool was used for identification
Distribution system maps:	*The attached distribution map shows the locations of the coliform sampling sites relative to our water sources and storage tank.*
Coliform Monitoring Plan:	*Not used.*
Distribution system hydraulic models:	*Not used.*
Water quality parameters:	*Chlorine residual, pressure.*
Justification:	*The free chlorine residual in the water entering the distribution system from the storage tank is maintained at 1.0 mg/L +/-0.2 mg/L. Based on daily measurements at the Department of Public Works building, where Sample Site 1 coliform samples are collected, the chlorine residual consistently measures at or near 0.8 mg/L. Water at the location where Sample Site 2 coliform samples are collected only has a detectable residual (about 0.1-0.2 mg/L). The higher pressure and higher chlorine residual at Sample Site 1, as well as its location near the storage tank entry point, demonstrate that water at the Sample Site 1 location is provided by the surface water source and not the ground water source.*

Example C:

D. Wells Representative of Each Other
(*Provide information about sources and justification for representativeness.*)

Are there ground water sources in your system that can be representative of each other: No

If yes, list sources and provide justification:

Ground water sources: *Valley View Well and Emergency Backup Well*

Justification:

The emergency backup well is located within 500' of the Valley View Well. It is turned on for less than one week a year while we are doing maintenance work on the Valley View Well.

The emergency backup well is a much shallower well and its water quality is different. If the emergency backup well is in service at the time of a positive coliform result at Sample Site 2, we will sample both the emergency backup well and the Valley View Well.

Example C:

E. Representative Triggered Monitoring Plan

(Complete the following information to indicate the ground water sources to be sampled based on a routine total coliform positive sample taken at a TCR site. Attach additional sheets if necessary.)

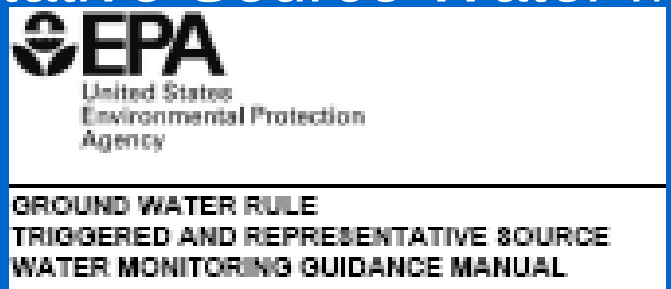
TCR Site	Zone	Sources Contributing to this TCR Site	Contributing Sources Representative of Each Other	Representative Source to Sample (Triggered)	Special Operating Considerations
1	*N/A*	*U-Drink-It Reservoir*	*N/A*	*None*	*N/A*
2	*N/A*	*U-Drink-It Reservoir, Valley View Well*	*N/A*	*Valley View Well, Emergency Backup Well (if in service)*	*Will only sample Emergency Backup Well if it was in service at the time of the coliform-positive result.*

Some things to keep in mind:

- If you have sources that are served by multiple TC sampling sites, and source water monitoring is ‘triggered’ a sample needs to be collected at the GWS for *each* positive distribution TC site.
- Don’t overlook justifying why and how you’ve made your Representative Source Water Monitoring determinations.
- If any piece of the submitted ‘plan’ is incomplete, a notice of incompletion will be sent out. The plan will not be reviewed unless it is complete.

Helpful Information:

- DWS: www.ct.gov/dph/publicdrinkingwater
- DWS GWR: Ground Water Rule http://www.ct.gov/dph/cwp/view.asp?a=3139&q=387306#GWR (“*Modifying a sampling site plan to allow use of representative sampling locations for triggered source water monitoring*”)
- US EPA: http://www.epa.gov/ogwdw000/disinfection/gwr/compliancehelp.html (“*GWR Triggered and Representative Source Water Monitoring Guidance (PDF)*”)



Questions???

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