

**STAGE 1 DISINFECTANTS/DISINFECTION BYPRODUCTS RULE MONITORING PLAN**  
**EXAMPLE FORMAT FOR GROUND WATER SYSTEMS<sup>1</sup>**

SECTION 1: SYSTEM INFORMATION			
System Name:		County:	
PWS ID Number:		Contact Person:	
Phone Number:	Cell (optional):	Fax Number (optional)	
e-mail address (optional):			

SECTION 2: SYSTEM CHARACTERISTICS			
SYSTEM TYPE		POPULATION DATA	
<input type="checkbox"/>	Community	Total Population Served <sup>1*</sup> :	
<input type="checkbox"/>	Non-Transient, Non Community	Number of Service Connections-	
<input type="checkbox"/>	Transient Non-Community <sup>2*</sup>	Source of Population Data (i.e. U.S. Census, Based on number of service connections (indicate multiplier) etc.)	
<input type="checkbox"/>	Consecutive	Effective Date of Population Data	

<sup>1\*</sup>In accordance with 62-550.821(2)(a), the number of persons served by a wholesale system must include the number of persons served by the consecutive systems that receive finished water from the wholesale system.  
<sup>2\*</sup> The Stage 1 D/DBP Rule **only** applies to TWS that are using chlorine dioxide.

SECTION 3: SOURCES OF RAW WATER/NUMBER OF TREATMENT PLANTS:			
<input type="checkbox"/> Ground	How Many Wells?		
<input type="checkbox"/> Purchased	If finished or raw water is purchased from a wholesale system(s), indicate the name and PWS ID Number for the system.	Wholesale System Name	PWS ID Number
Total number of water treatment plants =			
<ul style="list-style-type: none"> <li>◆ In accordance with 62-550.821(5), an entry point from a wholesale system to a consecutive system is considered a plant for the consecutive system.</li> <li>◆ If your system has submitted a request in accordance with 62-550.821(5)(a) or 62-550.821(9), F.A.C. to consolidate multiple entry points from a wholesale system or multiple plants treating water from multiple wells in the same aquifer as one treatment plant, please complete the TTHM/HAA5 consolidation table in Section 8.</li> <li>◆ Please note that booster chlorination stations should not be considered as separate water treatment plant(s).</li> </ul>			

<sup>1</sup>Monitoring plans must be prepared in accordance with 62-550.821(11), F.A.C. This example format does not address the monitoring plan requirements for subpart H systems or for PWSs using chlorine dioxide or ozone. Example format prepared by the Florida Department of Environmental Protection and the Florida Rural Water Association. Effective date 09/30/03.

**SECTION 4: DISINFECTANTS**  
**INDICATE THE DISINFECTANTS UTILIZED IN THE TREATMENT**  
**PROCESS AS A DISINFECTANT OR OXIDANT (CHECK ALL THAT**  
**APPLY)**

<input type="checkbox"/> Chlorine	If chlorine is selected as the primary disinfectant, indicate the chlorine type below	Does your system have one or more disinfection addition points after the entrance to the distribution system? (i.e. booster chlorination) <input type="checkbox"/> Yes <input type="checkbox"/> No  <i>If yes, indicate the number of addition points in your system:</i>
<input type="checkbox"/> Chloramines		
<input type="checkbox"/> Other (Specify <sup>1</sup> )		
	<input type="checkbox"/> Chlorine Gas	
	<input type="checkbox"/> Sodium Hypochlorite	
	<input type="checkbox"/> Calcium Hypochlorite	
	<input type="checkbox"/> Other (Specify)	

<sup>1</sup>Monitoring plans must be prepared in accordance with 62-550.821(11), F.A.C. This example format does not address the monitoring plan requirements for subpart H systems or for PWSs using chlorine dioxide or ozone.

**SECTION 5: SCHEMATIC DRAWING OF THE DISTRIBUTION SYSTEM**

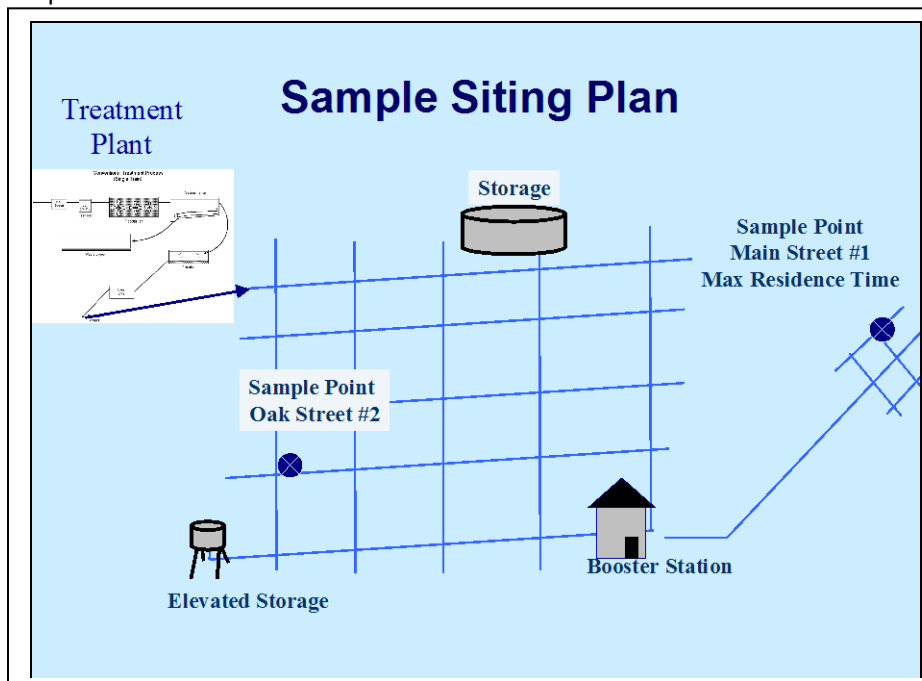
In accordance with Rule 62-550.821(11) (e) attach a schematic drawing of the system's distribution system. The schematic drawing at a minimum, must include the following information: (An example is provided below)

Entry points to the distribution system (i.e. water treatment plants and, if the system is a consecutive system, entry points from the wholesale systems)

Finished water storage facilities and booster chlorination facilities

Sampling locations identified and numbered

An example is provided below.



## SECTION 6: DISTRIBUTION SYSTEM CHARACTERISTICS

In accordance with 62-550.821(11)(f) F.A.C., provide a summary of typical distribution system operating characteristics. The summary should address seasonal operating characteristics and identify the areas where average and maximum residence times are expected to occur in the distribution system. Provide a brief explanation of why you believe the locations that you selected represent the maximum residence time(s). (You may have more than one location to represent your maximum residence time sampling point.) For example, "the maximum residence time is located in an area with several dead-ends"; "in the summer months few residents are served by our water system resulting in extended residence times", etc).



**SECTION 8: ROUTINE MONITORING FREQUENCY FOR TTHM AND HAA5**

System Population	Minimum Monitoring Frequency	Sample Location(s)	Number of Treatment Plants <sup>1</sup>	Minimum Number of Samples Required <sup>3</sup>	Number of samples your facility will collect	Indicate the month(s) that samples will be collected	Conditions for Increased Monitoring
Ground water system serving at least 10,000 persons	One sample per quarter per treatment plant	Locations representing the maximum residence time <sup>2</sup>					N/A
Ground water system serving less than 10,000 persons	One sample per year per treatment plant during the warmest month of water temperature	Locations representing the maximum residence time <sup>2</sup>					If the sample (or average if more than one sample is collected) exceeds the MCL, the system must increase monitoring to one sample per treatment plant per quarter, taken at a point representative of the maximum residence time

<sup>1</sup>If your system has submitted a request in accordance with 62-550.821(9), F.A.C. to consider multiple plants treating water from multiple wells in the same aquifer as one treatment plant, please complete the TTHM / HAA5 system consolidation information table below. Consecutive systems with multiple entry points into their distribution system that have requested to be considered as one plant should also complete the consolidation table below. (In accordance with 62-550.821(5), an entry point from a wholesale system to a consecutive system is considered a plant for the consecutive system.)

<sup>2</sup>Locations representing maximum residence time. If the system elects to sample more frequently than the minimum required, at least 25 percent of all samples collected each quarter (including those taken in excess of the required frequency) must be taken at locations that represent the maximum residence time of the water in the distribution system.

<sup>3</sup>Multiply the number of treatment plants by one (1) to obtain the minimum number of compliance samples required annually.

<b>TTHM / HAA5 SYSTEM CONSOLIDATION TABLE</b>				
<b>(This Section is only applicable for systems wishing to consolidate multiple entry points from a wholesale system or multiple plants treating water from the same aquifer in accordance with 62-550.821(5)(a) or 62-550.821(9), F.A.C.</b>				
System Type	Total Number of Treatment Plants/Number of Entry Points from the wholesale system	Date Request Submitted	Date DEP/DOH Approval Received (Attach letter of approval)	Total Number of Consolidated Treatment Plants or Wholesale System Entry Points
Ground Water System (multiple plants treating water from the same aquifer)				
Consecutive System				





**SECTION 11: SAMPLE COLLECTION PROCEDURES**

Parameter	Container	Cap/Septa Material	Sample Collection Guidelines	Preservative(s)	Maximum Holding Time	Analytical Method(s)
<b>Chlorine</b>	> 500 mL Plastic or Glass	N/A	Grab sample. Either free or total residual chlorine measurement is acceptable	None	Analysis should be completed within 15 minutes of collection	Free-Standard Methods (SM) 4500-C1D, CL F, 4500-C1 G <b>(DPD Colormetric)</b>
						Combined- SM 4500 CI D, F, G
						Total-SM 4500-CI D, E, F, G, I
<b>Chloramines</b>	> 500 mL Plastic or Glass	N/A	Grab sample. The residual measurement must be combined or total chlorine	None	Analysis should be completed within 15 minutes of collection	Standard Methods 4500C1 D, 4500C1E, 4500CL F4500-C1 I 4500-C1G- <b>(DPD Colormetric)</b> ASTM Method D 1253-86
<b>HAA5</b>	>100 mL amber glass	Teflon-lined septum	<ol style="list-style-type: none"> <li>Fill bottle completely but be careful not to flush out preservatives</li> <li>Sample should not have bubbles</li> <li>Sample disinfectant at time of collection</li> </ol>	NH <sub>4</sub> CL (ammonium chloride) <u>Review the specific method for max holding times/preservation procedures.</u>	28 days @ 4°C	EPA Method 552.1
	>50 mL amber glass				7-14 days @ 4°C	EPA Method 552.2
	40-60 mL glass vial				9 days @ 4°C to extraction, 21 days to analysis @ -11°C	Standard Method 6251B
<b>pH</b>	Plastic or Glass	N/A	Grab Sample	None	Sample should be analyzed within 15 minutes of collection	All methods allowed in 40 CFR 141.23(k)(1) including but not limited to Standard Method 4500 H B, EPA Method 150.1 & 150.2
<b>TTHM</b>	40-120 mL Glass vial	Teflon-lined septum	<ol style="list-style-type: none"> <li><b>Samples must be dechlorinated prior to acidification.</b></li> <li>Sample residual disinfectant at time of collection.</li> </ol>	Dechlorination with Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> and acidification using HCL to pH <2	14 Days @ 4°C	EPA Methods 502.2 , 524.2
	60 mL Glass vial	Teflon-lined septum		Sodium sulfite or NH <sub>4</sub> CL (ammonium chloride) with a phosphate buffer (pH = 4.5-5.5)	14 Days @ 4°C	EPA Method 551.1

**SECTION 12: MONITORING SUMMARY/CONDITIONS FOR REDUCED MONITORING FOR GROUND WATER SYSTEMS<sup>1</sup>**

PARAMETER	APPLICABILITY	ROUTINE MONITORING FREQUENCY	CRITERIA FOR REDUCED MONITORING	REDUCED MONITORING FREQUENCY*	IS YOUR SYSTEM CONDUCTING ROUTINE, REDUCED, OR <u>INCREASED MONITORING?</u>	
Chlorine/ Chloramines	PWSs that use the disinfectants	At the same time and location and frequency as total coliform sampling	<u>Monitoring may not be reduced.</u>	Not Applicable		
Total Trihalomethanes (TTHMs) & Haloacetic Acids 5 (HAA5s)	All CWS & NTNC systems that are adding a chemical disinfectant	Ground water systems serving at least 10,000 persons	One sample/ per quarter/ per treatment plant	≤ 50% of the TTHM & HAA5 RAA MCLs	One sample/ per year/ per treatment plant at maximum residence time location(s) in the distribution system during the month of warmest water temperature.	
		Ground water systems serving fewer than 10,000 persons	One sample/ per treatment plant/ during the month of the warmest water temperature	≤ 50% of the TTHM & HAA5 RAA MCLs for 2 years OR ≤ 25 % of the TTHM & HAA5 RAA MCLs for 1 year	One sample/ Every 3 years/ At max residence time location(s) in the distribution system during the month of warmest water temperature.	

<sup>1</sup> Please review 40 CFR 141.132 "Monitoring Requirements" for complete details on routine and reduced monitoring requirements.

\*In accordance with 40 CFR 141.132(5)(b)(1)(iii), systems on reduced monitoring may remain on a reduced schedule as long as the average of all samples taken in a year (for systems monitoring quarterly or more frequently) or the result of the sample (for systems monitoring annually during the month of the warmest water temperature) is no more than 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5s respectively. Systems that do not meet these criteria must return to routine monitoring.

**SECTION 13: METHOD FOR CALCULATING COMPLIANCE FOR MAXIMUM RESIDUAL DISINFECTANT LEVELS (MRDL) (CHLORINE AND/OR CHLORAMINES)**

Sample Locations: Within the distribution system at the same time and locations where samples for total coliform are collected in accordance with 62-550.518, F.A.C.

Compliance Determination: In accordance with 40 CFR 141.133(c)(1), compliance is based on a running annual arithmetic average computed quarterly, using the monthly averages of all samples collected

How to Determine Compliance with the MRDL:

1. Each month, add together the disinfectant residual results of all the samples taken during the month at the total coliform sampling locations. Divide by the total number of total number of samples. This is your monthly MRDL average.
2. Determine the running annual average. To determine the running annual average, add the twelve most recent consecutive monthly MRDL averages together, then divide by twelve. This is your running annual average.
3. Compare your running annual average to the MRDL for chlorine / chloramines of 4.0 mg/L. If your running annual average for the MRDL is less than 4.0 mg/L, the facility is in compliance with the maximum residual disinfectant level.

An example MRDL compliance calculation is provided below. The results are listed in mg/L.

Month	MRDL Monthly Averages	Reporting the MRDL to the Department
January 2004	4.5	<ul style="list-style-type: none"> <li>◆ Report your Monthly MRDL results to the Department on a quarterly basis.</li> <li>◆ Submit the quarterly RAA within 10 days of the end of each quarter</li> <li>◆ For example, January-March 2004 results are due to the Department on April 10, 2004.</li> </ul>
February 2004	3.5	
March 2004	3.2	
<b>April 2004</b>	4.6	
<b>May 2004</b>	3.3	
<b>June 2004</b>	2.4	
July 2004	3.4	
August 2004	2.9	
September 2004	2.8	
<b>October 2004</b>	2.7	
<b>November 2004</b>	2.4	
<b>December 2004</b>	3.1	
<b>MRDL Running Annual Average</b>	<b>Add the last 12 monthly averages to calculate the RAA</b> $4.5 + 3.5 + 3.2 + 4.6 + 3.3 + 2.4 + 3.4 + 2.9 + 2.8 + 2.7 + 2.4 + 3.1 = 38.8/12$ (Most Recent Months) = 3.2 mg/L	

The running annual average is 3.2 mg/L. Therefore, the system in the example is in compliance with the MRDL of 4.0 mg/L.

## SECTION 14: METHOD FOR CALCULATING COMPLIANCE WITH THE MAXIMUM CONTAMINANT LEVELS FOR TTHMS AND HAA5

Compliance Determination: In accordance with 40 CFR 141.133(b)(1), for systems monitoring quarterly (ground water systems serving > 10,000 persons) compliance is based on a running annual average computed quarterly, using the quarterly arithmetic averages of all samples collected by the system.

For systems monitoring less frequently than quarterly; (ground water systems (GWS) serving less than 10,000 persons that monitor annually) compliance is demonstrated if the single sample collected in the month of the warmest water temperature at a location representing the maximum residence time is in compliance with the MCL of 0.080 mg/L for TTHMs and 0.060 mg/L for HAA5. If the average of these samples exceeds the MCL, the facility is not immediately out of compliance. The system must increase to quarterly monitoring immediately. Compliance is then based on the running annual average, computed quarterly, using all of the quarterly sample results. (Note if the sum of fewer than four quarters of data exceeds 0.320 mg/L for TTHM or 0.240 mg/L for HAA5, then the system is immediately in violation since they will exceed the applicable MCL even if the remaining quarters are zero.)

### How to Determine Compliance with the MCLs for TTHM and HAA5 for Systems Monitoring Quarterly:

1. Determine the quarterly average. To calculate the quarterly average, add together the concentrations of all samples taken during the quarter (Please note that TTHM and HAA5 samples should be averaged separately.) Divide by the total number of samples to obtain the quarterly average.
2. Determine the running annual average. To determine the running annual average, add the four most recent consecutive quarterly averages together, then divide by four. This is your running annual average.
3. Compare your running annual averages for TTHM and HAA5. If your running annual average for TTHM and HAA5 is less than or equal to 0.080 mg/L or 0.060 mg/L respectively, the facility is in compliance with the MCLs.

An example of a TTHM compliance calculation is provided below. All values listed are in ug/L. (MCL in ug/L= TTHM= 80 ug/L HAA5 = 60 ug/L)

Quarter	Number of Sampling Points	TTHM Quarterly Average	TTHM Running Annual Average
Q1=Jan-Mar	3	$\frac{50 + 45 + 39}{3} = 45$	Q1 Average = 45 Q2 Average = 50 Q3 Average = 84 Q4 Average = 70 <hr style="width: 50%; margin: 10px auto;"/> $\frac{45 + 50 + 84 + 70}{4} = \mathbf{62}$
Q2=Apr-Jun	3	$\frac{57 + 49 + 43}{3} = 50$	
Q3 =Jul-Sep	3	$\frac{75 + 80 + 98}{3} = 84$	
Q4 =Oct-Dec	3	$\frac{60 + 72 + 79}{3} = 70$	

The running annual average for TTHM in this example is 62 ug/L. Therefore, the system is in compliance with the MCL of 80 ug/L.