Compliance Monitoring Plan - Long Form for the Stage 2 Disinfectants and Disinfection Byproducts Rule

Date Submitted: _____

PART 1 - General System Information

Water System Name:			PWSID#:			
Mailing Address:						
Contact Person:		Phone:	Email:			
System Type:	Community (CWS) INon-	transient non-community (NTN	NC) Population Served:			
	Source(s):	Surface Water 🛛 🗌 Groun	nd Water (wells)] GWUDI*		
	Number of Each Type:					
Source Water Type:	Number of Treatment Plants:	<u> </u>				
Purchase Only	Number of Entry Points:	<u> </u>				
	Name of Curfore Mater Diant/a) if a					
	Name of Surface Water Plant(s), if applicable:					
	Chlorine (gas, liquid or powder)	Surface Water Plant(s)	Ground Water Plant(s)	GWUDI Plant(s)		
Treatment provided by YOUR public water system:	Chloramines			GWUDI Plant(s)		
	Ozone	Surface Water Plant(s)	Ground Water Plant(s)	GWUDI Plant(s)		
(Check treatments used and indicate how many of each type of plant	Chlorine Dioxide	Surface Water Plant(s)	Ground Water Plant(s)	GWUDI Plant(s)		
uses the treatment)	Conventional Filtration	Surface Water Plant(s)	Ground Water Plant(s)	GWUDI Plant(s)		
	Membrane Filtration	Surface Water Plant(s)	Ground Water Plant(s)	GWUDI Plant(s)		

	Seller's Name: # of interconnections:	PWSID#: Source Type: Frequency Used:	Surface Water/GWUDI Ground Water (wells) Emergency Seasonal
	Seller's Name: # of interconnections:	PWSID#: Source Type: Frequency Used:	Surface Water/GWUDI Ground Water (wells)
	Seller's Name: # of interconnections:	PWSID#: Source Type: Frequency Used: 🔲 Regular basis	Surface Water/GWUDI Ground Water (wells) Emergency Seasonal
	Seller's Name: # of interconnections:	PWSID#: Source Type: Frequency Used:	Surface Water/GWUDI Ground Water (wells) Emergency Seasonal
System Interconnection(s): //f.conline.html	Seller's Name: # of interconnections:	PWSID#: Source Type: Frequency Used: 🗌 Regular basis	Surface Water/GWUDI Ground Water (wells)
(If applicable – for systems purchasing or selling water)	Buyer's Name: # of interconnections:	PWSID#: Source Type: Frequency Used:	Surface Water/GWUDI Ground Water (wells)
	Buyer's Name: # of interconnections:	PWSID#: Source Type: Frequency Used:	Surface Water/GWUDI Ground Water (wells)
	Buyer's Name: # of interconnections:	PWSID#: Source Type: Frequency Used:	Surface Water/GWUDI Ground Water (wells)
	Buyer's Name: # of interconnections:	PWSID#: Source Type: Frequency Used:	Surface Water/GWUDI Ground Water (wells)
	Buyer's Name: # of interconnections:	PWSID#: Source Type: Frequency Used: 🔲 Regular basis	Surface Water/GWUDI Ground Water (wells) Emergency Seasonal

If applicable, clarify/explain your interconnection arrangement if your system has multiple interconnections with the same source that are used at different frequencies.

PART 2 - Sample Site Information

N/A – System does not monitor for any of the parameters in the Parameter Code Key Table

Parameter Code Key CIO₂ = Chlorine Dioxide CLT = Chlorite TOC = Total Organic Carbon ALK = Alkalinity SUVA = Specific Ultraviolet Absorption (UV₂₅₄ and DOC) BRO₃ = Bromate

Sample Type Key	
RW = Raw Source Wate PS = Plant (post sedimen EP = Entry Point DS = Distribution System	r ntation) n

Sample Site Information - Chlorine Dioxide, Chlorite, Total Organic Carbon, Alkalinity, Specific Ultraviolet Absorption, Bromate

Parameter Code	Sample Type	Treatment Plant (Facility) ID	Sample Pt ID	Site Location or Address

Sample Site Information - TTHM/HAA5

Sample Pt ID	Site Location or Address	Sample Type	Justification ¹	Reduced Monitoring Location? ²
B01		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B02		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B03		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B04		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B05		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B06		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B07		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B08		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No

Sample Pt ID	Site Location or Address	Sample Type	Justification ¹	Reduced Monitoring Location? ²
B09		High TTHM 🔲 High HAA5 🔲		☐ Yes ☐ No
B10		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B11		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B12		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B13		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B14		High TTHM 🛛 High HAA5 🗍		☐ Yes ☐ No
B15		High TTHM 🔲 High HAA5 🔲		☐ Yes ☐ No
B16		High TTHM 🔲 High HAA5 🔲		☐ Yes ☐ No

¹ Provide the reason for the selection of a specific sample location. (*i.e.,* "High TTHM": Highest TTHM levels expected at this location based on distribution system modeling and special sampling).

² Even if a system qualifies for reduced compliance monitoring, the monitoring plan must still include the required number of routine monitoring sites (under the Stage 2 DBPR) and identify which locations will be used for reduced monitoring.

PART 3 - Proposed Schedule & Compliance Calculations

Parameters: Total Trihalomethanes (TTHM) / Haloacetic Acids (HAA5)

Required: if water contains any disinfectant or oxidant

Report to State: same as monitoring frequency

Monitoring Type	Monitoring Frequency	Total # of Monitoring Locations / Monitoring Period	Samples ¹	Schedule (<i>i.e.,</i> 1 st Wk/Jul, 1 st Wk/Oct, etc.) ²
Routine	Quarterly Annually			
Reduced ³	Quarterly Annually Triennially		-	
Increased ⁴	Quarterly		Dual Sample Sets [

⁴ Systems on increased monitoring are required to take dual sample sets at all locations.

¹ Individual samples indicate that only one parameter, TTHM or HAA5, is being monitored at the monitoring locations. Dual sample sets indicate that both TTHM and HAA5 are being monitored at all monitoring locations.

² Schedules indicated for TTHM/HAA5 monitoring should be a specific week (*i.e.*, 1st Wk/Jul), ensuring that the compliance monitoring is scheduled during the peak historical month, as determined by historical DBP sampling results or as justified using other criteria such as the month of warmest water temperature. Systems on a quarterly schedule must monitor every 90 days.

³ In addition to meeting the TTHM and HAA5 criteria for reduced monitoring, any system using surface water or GWUDI sources serving ≥ 500 people that want to reduce TTHM/HAA5 monitoring must also demonstrate a source water TOC running annual average is equal to or less than 4.0 mg/L (based on the most recent 4 quarters of monitoring), on a continuing basis, at each treatment plant treating surface water or GWUDI.

Compliance Information:

Parameter		Compliance Location	Maximum Contaminant Level (MCL)		
ТТН	М	Each Monitoring Site	MCL = 0.080 mg/L		
НАА	5	Each Monitoring Site	MCL = 0.060 mg/L		
Compliance Calculation:					
Quarterly Monitoring:	An MCL violation occurs if the Locational Running Annual Average (LRAA), computed quarterly for the most recent 4 quarters, at any monitoring location, exceeds the MCL, <u>or</u> if the LRAA calculated based on fewer than 4 quarters of data demonstrates that the MCL will be exceeded regardless of the monitoring results of subsequent quarters. If more than one sample is taken at a location in any given quarter, then those values are averaged to obtain that quarter's average for use in the LRAA calculation.				
Annual or Triennial Monitoring:	If any single sample re	nonitor annually or less frequently shall determine esult exceeds the MCL, the system shall increase at all locations. MCL compliance is then calculate	monitoring to dual sample sets once per quarter		

Operational Evaluation Level (OEL) Information:

Parameter		Compliance Location	Maximum OEL Level	
TTHM		Each Monitoring Site	OEL = 0.080 mg/L	
HAA5		Each Monitoring Site	OEL = 0.060 mg/L	
Compliance Calculation:				
Quarterly Monitoring:	 hitoring: Each quarter, public water systems shall calculate the TTHM and HAA5 Operational Evaluation Level (OEL) for each monitoring location to be aware of any pending follow-up activities as indicated below. The OEL for TTHM and HAA5 is the sum of the two previous quarters' results plus twice the current quarter's result, divided by 4. OEL = (2 X current quarter result) + (previous quarter result) + (quarter before previous quarter result) If the TTHM OEL exceeds 0.080 mg/L, or the HAA5 OEL exceeds 0.060 mg/L at any monitoring location, the system shall conduct an operational evaluation to identify the cause of the exceedance and submit a written report of the evaluation to the North Carolina Public Water Supply Section no later than 90 days after being notified of the analytical result that causes the system to exceed the operational evaluation level. The written report must be made available to the public upon request. 			
Annual or Triennial Monitoring:	OEL calculations are not required.			

Parameter: DBP Precursors

Required: if systems using SW / GWUDI sources have conventional filtration

□ N/A – Not Applicable

Report to State: monthly or quarterly (if quarterly, report data for each month of the quarter)

<u>TOC</u>

Monitoring Type	Monitoring Frequency	Sample Type	Samples per Period ¹	Monthly Schedule (<i>i.e.,</i> 1 st Tues. of month) Quarterly Schedule (<i>i.e.,</i> 1 st Wk/Jul)	Associated Treatment Plant (Facility) ID or Associated SW / GWUDI Source (Facility) ID
Routine	Monthly	Raw Water (RW)			
Rouline	Monthly	Plant (PS)			
Reduced ²	Quarterly	Raw Water (RW)			
	Quarterly	Plant (PS)			

Alkalinity ³

Monitoring Type	Monitoring Frequency	Sample Type	Samples per Period	Schedule	Associated SW / GWUDI Source (Facility) ID
Same as for TOC	Same as for TOC	Raw Water (RW)	Same as for TOC	Same as for TOC	Same as for TOC

Optional SUVA (only if a system wishes to meet the SUVA Alternative Compliance Criteria)

Monitoring Type	Monitoring Frequency	Sample Type	Samples per Period	Schedule (<i>i.e.,</i> 1 st Tues. of month)	Associated Treatment Plant (Facility) ID or Associated SW / GWUDI Source (Facility) ID
Doutino	Monthly	Raw Water (RW)			
Routine	Monthly	Plant (PS)			

¹ This represents the total number of samples for all conventional treatment plants.

² Monitoring may be reduced to quarterly if the running annual average post-sedimentation TOC is < 2.0 mg/L for 2 consecutive years or < 1.0 mg/L for 1 year.

³ Source water alkalinity samples must be taken on the same day, at the same time, and from the same tap as the source water TOC samples.

Compliance Information:

Parameter	Compliance Location	Compliance Requirement
Disinfection Byproduct Precursors	Each Treatment Plant	Treatment Technique = TOC removal ratio (calculated as a running annual average) must be \geq 1.00

Compliance Calculation:

A treatment technique violation occurs if the system does not achieve the TOC percent removed specified in the matrix below (Step 1) and the State has not approved an alternate minimum TOC removal percentage (Step 2). Compliance with the Step 1 removal requirement is determined by a running annual average, calculated quarterly, of the ratio of TOC percent removal achieved to the TOC percent removal required. A violation occurs if the running annual average is < 1.00.

Step 1 Required TOC Removal by Enhanced Coagulation and Enhanced Softening ¹

	Source Water Alkalinity, mg/L as CaCO ₃ (in percentages)			
Source Water TOC (mg/L)	0 - 60	> 60 – 120	> 120 ²	
> 2.0 - 4.0	35.0	25.0	15.0	
> 4.0 - 8.0	45.0	35.0	25.0	
> 8.0	50.0	40.0	30.0	

There are other *Alternative Compliance Criteria* (ACC) that a system may use on a monthly or annual basis to achieve compliance with the Enhanced Coagulation Treatment Technique. If ACC are used on a monthly basis a 1.0 may be substituted in the compliance calculation for the Step 1 removal ratio.

- 1. If the source water TOC is less than 2.0 mg/L³
- 2. If the treated water TOC is less than 2.0 mg/L ³
- 3. If the source water SUVA values are 2.0 L/mg-m or less ³
- 4. If the finished water SUVA values are 2.0 L/mg-m or less ³
- 5. If the TTHM levels are 0.040 mg/L or less <u>AND</u> HAA5 levels are 0.030 mg/L or less (as running annual averages) and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system. (annual ACC only)

There are also two other annual ACC for systems using Enhanced Softening.

- 1. Softening that results in lowering the treated water alkalinity to less than 60 mg/L (as CaCO₃), measured monthly and calculated quarterly as a running annual average. (annual ACC only)
- 2. Softening that results in removing at least 10 mg/L of magnesium hardness (as CaCO₃), measured monthly and calculated quarterly as an annual running average. (annual ACC only)

¹ Enhanced softening means the improved removal of DBP precursors by precipitative softening.

² Systems practicing enhanced softening must meet the TOC removal requirements in this column.

³ ACCs can be used on a monthly or permanent basis.

Parameter: Optional Total Organic Carbon (TOC)

Required:¹ for any SW or GWUDI system serving \geq 500 people requesting to reduce TTHM/HAA5 monitoring that are **not** conducting TOC monitoring for compliance \square N/A – Not Applicable

Report to State: same as monitoring frequency

Monitoring Type	Monitoring Frequency	Sample Type	Samples per Period ²	Monthly Schedule (<i>i.e.,</i> 1 st Tues. of month) Quarterly Schedule (<i>i.e.,</i> 1 st Wk/Jul) ³	Associated SW / GWUDI Source (Facility) ID
Routine (to qualify for a reduced TTHM/HAA5 monitoring frequency)	Monthly	Raw Water (RW)			
Reduced (once on a reduced TTHM/ HAA5 monitoring frequency)	Quarterly	Raw Water (RW)			

Compliance Information:

Parameter	Compliance Location	Compliance Requirement
тос	Each Treatment Plant	Post-sedimentation TOC running annual average must be <u><</u> 4.0 mg/L

Compliance Calculation:

In addition to meeting the TTHM/HAA5 levels, the post-sedimentation TOC running annual average (RAA) must be \leq 4.0 mg/L at each plant treating SW or GWUDI sources to qualify for and remain on a reduced TTHM/HAA5 monitoring frequency. The running annual average is calculated quarterly from the most recent 4 quarters of data. If the TOC frequency is monthly, a quarterly value is first calculated for each calendar quarter of monthly data. If the frequency is quarterly, the result for that quarter is the quarterly value. These quarterly values are then used to calculate the running annual average.

Post-sedimentation TOC RAA = <u>Sum (results from 4 most recent quarters)</u>

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¹ Systems using conventional filtration that are conducting TOC monitoring for the Enhanced Coagulation TT should complete the TOC proposed schedule on page 10.

² The number of samples equals the number of entry points from SW or GWUDI sources.

³ Monthly monitoring should be conducted every 30 days; quarterly monitoring should be conducted every 90 days.

Parameter: Chlorine Dioxide (CIO2)

<i>Required</i> : if water is treated with chlorine dioxide	N/A – Not Applicable
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Report to State: monthly

CIO₂ treatment is used:
Year round

Seasonally (if seasonally, please indicate the months CIO₂ treatment is in use) _____

Monitoring Type	Monitoring Frequency	Sample Type	# Samples / Month ¹	Schedule	Associated Treatment Plant (Facility) ID
	Daily (when ClO ₂ in use)	Entry Point (EP) ²		Daily	
Routine	Day after any "EP" measurement > 0.8 mg/L	Distribution (DS) ³	A 3-sample set for each "EP" result > 0.8 mg/L	Day after "EP" > 0.8 mg/L	N/A

Calculation for determining number of # Samples (Entry Point Treatment Days)

 CIO_2 must be measured at *each* entry point *each* day that water treated with CIO_2 is supplied to the distribution system. Because a water system may have more than one entry point supplying water treated with CIO_2 on any given day, the number of "Entry Point Treatment Days" is used to calculate the number of "EP" samples required each month. The number of "Entry Point Treatment Days" is determined by adding up the total number of days all entry points are delivering CIO_2 treated water each month.

				Number of days per month each				
<u>1st Entry Point</u> Number of days per month delivering water containing chlorine dioxide.	+	2 nd Entry Point Number of days per month delivering water containing chlorine dioxide.	+	additional "EP" delivering chlorine dioxide treated water.	=	Number of entry point treatment days	=	Number of samples per period

¹ The number of samples is expressed as 'entry point treatment days' (see formula).

² Purchased water entry points are excluded, unless chlorine dioxide is added to the purchased water at that entry point.

³ Distribution system samples are <u>not</u> required as long as the "EP" samples are at or below the MRDL. "DS" samples (a 3-sample set) must be taken on each day following any "EP" sample result that exceeds the MRDL. A 3-sample set is required for each "EP" sample that exceeds the MRDL. Therefore, the total number of "DS" samples per month equals 3 times the number of "EP" samples that exceed the MRDL.

Compliance Information:

	Parameter	Compliance Type	Maximum Contaminant Level (MCL)	
Chlorine Dioxide		System Level	MCL = 0.8 mg/L	
Compliance Calculation	Calculation:			
Acute Violation:	An acute MRDL violation occurs if any daily "EP" sample exceeds the MRDL, and on the following day 1 or more of the 3 "I samples also exceeds the MRDL (or the system fails to take the 3 required "DS" samples the following day).			
Nonacute Violation:	A nonacute MRDL violation occurs if any 2 consecutive daily "EP" samples exceed the MRDL but all "DS" samples are below MRDL. Failure to conduct "EP" sample monitoring the day following an "EP" sample exceedance of the chlorine dioxide MRD also a nonacute MRDL violation.			

Parameter: Chlorite

Required: if water is treated with chlorine dioxide

 \square N/A – Not Applicable

Report to State: monthly

Monitoring Type	Monitoring Frequency	Sample Type	# Samples / Month ¹	Monthly Schedule (<i>i.e.,</i> 1 st Tues. of month) Quarterly Schedule (<i>i.e.,</i> 1 st Wk/Jul)	Associated Treatment Plant (Facility) ID
Doutino	Daily (when ClO ₂ in use)	Entry Point (EP) ²			
Routine	Monthly	Distribution (DS)	(See footnote ³)		
Reduced ⁴	Quarterly	Distribution (DS)	(See footnote ³)		

Compliance Information:

Parameter	Compliance Type	Maximum Contaminant Level (MCL)			
Chlorite	System Level	MCL = 1.0 mg/L			
Compliance Calculation:					
A MCL violation occurs if the arithmetic average of any 3-sample set in the distribution system exceeds the MCL.					
Compliance Value = <u>Sum (each individual result of 3-sample set)</u> 3					

¹ The monitoring period is expressed in terms of a month. The number of **chlorite** entry point samples per month is equal to the same number of **chlorine dioxide** samples per month (see formula in Chlorine Dioxide section). One set equals 3 samples per month.

² Purchased water entry points are excluded unless chlorine dioxide is added to the purchased water at that entry point.

³ At least one 3-sample set must be taken each monitoring period. However, for any daily "EP" sample that exceeds the chlorite MCL value, a 3-sample set of "DS" samples must be taken the following day. One such set will fulfill the routine monthly requirement.

⁴ If, after one year of monitoring, no individual chlorite samples ("EP" *or* "DS") have exceeded the chlorite MCL, distribution system monitoring may be reduced to one 3-sample set per quarter. The entry point chlorite monitoring frequency may not be reduced.

Parameter: Bromate

Required: if water is treated with ozone (O₃)

 \square N/A – Not Applicable

Report to State: monthly or quarterly (if quarterly, report data for each month of the quarter)

O₃ treatment is used: ☐ Year round Seasonally (if seasonally, please indicate the months O_3 treatment is in use)

Monitoring Type	Monitoring Frequency	Sample Type	Samples per Period ¹	Monthly Schedule (<i>i.e.,</i> 1 st Tues. of month) Quarterly Schedule (<i>i.e.,</i> 1 st Wk/Jul)	Associated Treatment Plant (Facility) ID
Routine	Monthly	Entry Point (EP) ²			
Reduced ³	Quarterly	Entry Point (EP) ²			

Compliance Information:

Parameter	Maximum Contaminant Level (MCL)
Bromate	MCL = 0.010 mg/L

Compliance Calculation:

An MCL violation occurs if the running annual average, computed guarterly, of monthly samples exceeds the MCL. A RAA is calculated separately for each entry point supplying water treated with ozone.

¹ A bromate sample is required for each entry point that supplied water treated with ozone during the period.

² Purchased water entry points are excluded unless ozone is added to the purchased water at that entry point.

³ A system required to analyze for bromate may reduce monitoring from monthly to quarterly at an entry point, if the running annual average bromate concentration, computed quarterly, is less than or equal to 0.0025 mg/L for that entry point (based on the monthly measurements for the most recent 4 quarters). Entry points qualifying for reduced bromate monitoring may remain on reduced monitoring as long as the running annual average of quarterly bromate samples is less than or equal to 0.0025 mg/L. If the running annual average bromate concentration is greater than 0.0025 mg/L. the "EP" shall resume routine monitoring.

PART 4 - System Schematic and System Changes

- A. Attach a map or drawing of your current distribution system. Include the location of any interconnections with other public water systems. Include the entire distribution system for any water systems for which your system is the responsible party for compliance monitoring. Also, where applicable, designate on the map, using the 3-digit location code, the locations of the following in relation to the distribution system mains:
 - Sources
 - Treatment Plants
 - Entry Points
 - Storage Facilities, including volume
 - Booster Stations
 - All compliance sample sites that are required under the Stage 2 DBPR
- B. Have there been any major changes to your distribution system since you last updated your Stage 2 DBP compliance monitoring plan?

If Yes, explain (attach additional sheets if necessary).