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TO: Office of Drinking Water Staff

THROUGH: J. Wesley Kleene, Ph.D., P.E., Director
Office of Drinking Water

FROM: John I. Capito, P.E., Chairman
M/DBP Rule Team

SUBJECT: Water – Surveillance & Regulations – Stage 2 DBP - Initial Distribution System
Evaluation - System Specific Study and Standard Monitoring Plan

Revision Highlights: Added Section on Ordering and Recording Samples Results

SUMMARY STATEMENT:

This memo provides staff guidance on the development, review and approval of a Standard Monitoring Plan and a System Specific Study (existing data) as required by the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2), promulgated by EPA on December 15, 2005, published in the January 4, 2006, Federal Register and effective on March 6, 2006. The memo is based on the Stage 2 rule, the IDSE Guidance Manuals, and the Guidance Manual for EPA and State Review. These documents may be found on EPA’s website for Stage 2 (<http://www.epa.gov/safewater/disinfection/stage2/index.html>) or on the ODW Share directory (Hank\03-Committees\MDBP and ESWT Rules\Stage 2 and LT2 Rules\IDSE Guidance Manuals).

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BACKGROUND:

All community waterworks and those nontransient noncommunity waterworks which serve at least 10,000 people and use a primary or residual disinfectant other than ultraviolet light; or, deliver water that has been treated with a primary or residual disinfectant other than ultraviolet light must conduct an Initial Distribution System Evaluation (IDSE). The purpose of the IDSE is to identify locations most representative of high TTHM and HAA5 concentrations throughout the distribution system for compliance monitoring under Stage 2. Four IDSE options are available: Very Small System Waiver, 40/30 Certification, Standard Monitoring, or System Specific Study. VSS Waivers and 40/30 Certifications are addressed in WM 891, dated 23 Feb 2006.

The following definitions apply to the implementation of this Rule:

Combined Distribution System (CDS) – the interconnected distribution system consisting of the distribution systems of wholesale waterworks and consecutive waterworks that receive finished water. NOTE: The following may be excluded from the definition:

- 1) Consecutive waterworks:
 - (a) If they receive water on an emergency basis only, or;
 - (b) If they receive <10% of their total water consumption from another waterworks.
- 2) Wholesale waterworks:
 - (a) If they sell water on an emergency basis only, or;
 - (b) If they deliver <10% of the total water used by a consecutive waterworks.

Consecutive Waterworks – a waterworks that receives some or all of its finished water from one or more wholesale waterworks. Delivery may be through a direct connection or through the distribution system of one or more consecutive waterworks.

Wholesale Waterworks – a waterworks that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another waterworks. Delivery may be through a direct connection or through the distribution system of one or more consecutive waterworks.

Dual Sample Set – a set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5.

CONSUMER CONFIDENCE REPORTS

Waterworks are required to include individual sample results for the IDSE in their CCR when determining the range of TTHM and HAA5 results for the calendar year that the IDSE samples were taken.

IDSE PLANS

All applicable waterworks which have not received the 40/30 Certification or the Very Small System Waiver (per WM 891) must conduct either Standard Monitoring or a System Specific Study and submit plans to this Office as stated in the following table:

POPULATION SERVED	SUBMIT STANDARD MONITORING PLAN OR SYSTEM SPECIFIC STUDY PLAN BY
<i>Waterworks that are not part of a combined distribution system and waterworks that serve the largest population in the combined distribution system</i>	
≥100,000	October 1, 2006
50,000-99,999	April 1, 2007
10,000-49,999	October 1, 2007
<10,000 (CWS Only)	April 1, 2008
<i>Other Waterworks that are part of a combined distribution system</i>	
Wholesale waterworks or consecutive waterworks	at the same time as the waterworks with the earliest compliance date in the combined distribution system

NOTE: All consecutive waterworks which are part of a CDS must comply with the IDSE based on the schedule of the largest waterworks in the CDS.

NTNC waterworks which serve fewer than 10,000 persons are exempted from the requirement to conduct an IDSE (see §141.600 (b)).

The EPA model Standard Monitoring Plans (SMP) and System Specific Study Plan (SSS) are included in Appendix A and B, respectively. Waterworks may submit their own form; however, EPA’s model forms cover all the required elements. A system schematic must be attached. The forms are available on EPA’s website (www.epa.gov/safewater/disinfection/tools/tools-idse.html) as part of the IDSE Tool and can be completed on line, although waterworks must print out a paper copy for submittal to ODW. Electronic submittal through the EPA website is **not** an option. A CD-ROM version of the IDSE Tool is available by contacting [National Service Center for Environmental Publications \(NSCEP\)](#) at 1-800-490-9198 publication number EPA 815-C-06-001.

STANDARD MONITORING

Standard monitoring is one year of increased distribution system monitoring at non-Stage 1 sites, to identify high TTHM and HAA5 locations. The SMP must include the following elements:

- distribution system schematic including sources, entry points, storage facilities, standard monitoring sites and Stage 1 compliance monitoring sites,
- justification of standard monitoring locations selected and a summary of data used to justify the location selection,
- justification for the peak historical month selected,
- population served and waterworks type (surface water, groundwater under the direct influence of surface water or groundwater)

Site Selection

Waterworks will use the following table to determine monitoring frequency and the number and type of standard monitoring sites required. A dual sample set is required at each monitoring location during each monitoring period. The peak historical month is the month with the highest TTHM or HAA5 levels or the warmest water temperature.

Source Water	Population Served	Monitoring Periods and Frequency of Sampling	Distribution System Monitoring Locations				
			Total per monitoring period	Near Entry Points	Average Residence Time	High TTHM Locations	High HAA5 Locations
Surface water or groundwater under the direct influence of surface water	<500 consecutive waterworks	One (during peak historical month)	2	1	-	1	-
	<500 non-consecutive waterworks	One (during peak historical month)	2	-	-	1	1
	500 - 3,300 consecutive waterworks	Four (every 90 days)	2	1	-	1	-
	500 - 3,300 non-consecutive waterworks	Four (every 90 days)	2	-	-	1	1
	3,301 – 9,999	Four (every 90 days)	4	-	1	2	1
	10,000 – 49,000	Six (every 60 days)	8	1	2	3	2

Source Water	Population Served	Monitoring Periods and Frequency of Sampling	Distribution System Monitoring Locations				
			Total per monitoring period	Near Entry Points	Average Residence Time	High TTHM Locations	High HAA5 Locations
	50,000 – 249,999	Six (every 60 days)	16	3	4	5	4
	250,000 – 999,999	Six (every 60 days)	24	4	6	8	6
	1,000,000 – 4,999,999	Six (every 60 days)	32	6	8	10	8
Groundwater	<500 consecutive waterworks	One (during peak historical month)	2	1	-	1	-
	<500 non-consecutive waterworks	One (during peak historical month)	2	-	-	1	1
	500 – 9,999	Four (every 90 days)	2	-	-	1	1
	10,000 – 99,000	Four (every 90 days)	6	1	1	2	2
	100,000 – 499,999	Four (every 90 days)	8	1	1	3	3
	≥500,000	Four (every 90 days)	12	2	2	4	4

In selecting sites, it is recommended that waterworks use an up-to-date map of the distribution system which shows all entry points, sources, storage facilities, layout of pipes, pump station locations, pressure zone boundaries, locations of large users and population density information. Other useful information for site selection could include: disinfectant residual data, Stage 1 DBP data, microbiological monitoring data (e.g., HPC), source water characteristics, tank level data, pump run times, and distribution system model and tracer studies.

Near Entry Point Site is located between the entrance to the distribution system and the first customer, but no later than the first customer. Consecutive waterworks may use a sample tap at the master meter if available. Consider only entry points with disinfected water. If there are fewer entry point sites available than the required number of entry point sites, the waterworks

must replace unassigned near entry point sites with an equal number of high TTHM and HAA5 sites to obtain the total required number of standard monitoring sites. If there are more entry points than the required near entry point sites, the waterworks must use entry point sites with the highest annual water flows.

Average Residence Time Sites are located in the geographic center of the distribution system for small straightforward layouts with few large customers. Complex waterworks may consider using disinfectant residual data, a hydraulic model or a tracer study to select average residence time sites. Waterworks may consider using billing records and population density information to rule out areas with low or high water age since these would not qualify for average residence time sites. Waterworks with multiple sources and pressure zones should try to locate an average residence time site in each pressure zone or area influence by each source. Guidance for using disinfectant residual data can be found in Appendix C.

High TTHM Sites are locations with increased water age. These sites would typically be found:

- hydraulically downstream of storage facilities and booster disinfection facilities;
- near dead ends where water flow is low or stagnant;
- near the ends of distribution systems at or before the last customers;
- smaller lines far from the main transmission lines;
- low disinfectant residual concentration;
- sparsely populated residential areas.

Sampling locations should be representative of the water that is being consumed; therefore, sites should **not** be chosen at the very end of a dead end line.

High HAA5 Sites are locations with increased water age, although, these sites must be different from the high TTHM sites. Waterworks should evaluate if biodegradation is occurring in their distribution systems. Biodegradation can occur when disinfectant residual levels are low or non-existent allowing the presence of microorganisms which may consume HAA5 causing the HAA5 levels to decrease.

Review of historical HAA5 data can generally indicate if biodegradation is occurring. If the highest HAA5 values typically occur in the summer months, at the maximum residence time location and at the same time of the year and locations as high TTHM values, then it is **unlikely** that biodegradation is occurring. If the highest HAA5 values do not typically occur in the summer months, or are not found at the maximum residence time location or do not occur at the same time of the year and locations as high TTHM values, then it is **likely** that HAA5 compounds may be degrading in the waterworks due to biological activity.

Biodegradation is more likely to occur when disinfectant residual levels are low or non-existent and particularly during the warmer months. Therefore, high HAA5 sites should not be chosen in locations where the free chlorine residual is 0.2 mg/l or less (0.5 mg/l for chloramines residuals) or locations where the HPC levels are high. If biodegradation appears to be a problem, high HAA5 sites should be chosen in areas of less water age where disinfectant residuals are less than the waterworks' average (see Appendix C) yet maintained above 0.2 mg/l for free chlorine (0.5 mg/l for chloramines). If biodegradation is not a problem, then high HAA5 site selection should follow the same criteria used to locate high TTHM sites.

EPA recommends that waterworks select numerous candidate sites based on the above and plot them on a map along with the Stage 1 compliance monitoring sites. Then they may choose the best locations to meet the required number and type of sample locations considering the following:

- Standard monitoring and Stage 1 sites provide good geographic diversity and coverage
- Sites represent different pressure zones
- Sites represent mixing zones if there are multiple sources with different water quality characteristics
- Sites are accessible
- Sites are not located next to Stage 1 sites
- Stage 1 sites are not used for standard monitoring sites

Site Selection Justification

Justifications need to document the key site characteristic(s) that led to choosing the site for standard monitoring. Examples are as follows:

Site	Adequate Justification	Poor Justification
High HAA5	This site is served by our surface water source and is located on an 8-inch pipe in a commercial area. It is in an area of average to high water age that has a history of high chlorine residual concentrations (2 to 2.2 mg/L in the summer). HPC levels for this site have historically been low compared to the rest of the system (< 500).	Site is a high HAA5 site. Stage 1 site has had high HAA5s so we located standard monitoring site right next to it.
High TTHM	Site is at the extreme end of the DS down gradient of a tank with a low turn-over rate. It is in a residential area with primarily 6-inch pipes and with chlorine residual ranging from 1.0 to 1.2 in the summer.	Site is a high TTHM site.

Summary of Data

Waterworks must provide a summary of the data (water quality data, distribution system operations, chlorine residuals, storage tanks, etc.) used to justify the standard monitoring sites. Following is an example:

We used residual data from Total Coliform sites collected from 2003 through 2005 and our current system map to select sites. We evaluated chlorine residual data from June and July (range from 0.2 - 2.3 mg/L), and calculated our system average (0.9-1.1 mg/L). Sites with residuals close to this were considered for average residence time sites. Residual data along with information on storage tanks, booster stations, and operator notes were used to locate areas of high residence time for high TTHM and HAA5 sites. We do not have HPC data to identify potential biological activity, so we evaluated residual data, coliform data, and customer complaint records. We plotted all of our candidate sites on our map to ensure that they are geographically and hydraulically diverse.

Peak Historical Month

Each waterworks must identify its peak historical month. The peak historical month is defined as the month with the highest TTHM or HAA5 levels or the warmest water temperature and is chosen to represent the worst case scenario of conditions when DBPs would be the highest. Waterworks should focus on the actual historical TTHM and HAA5 monitoring results because water temperature may not always be a good indicator of DBP formation.

If the highest TTHM and highest HAA5 levels occur during different months, they should consider which contaminant shows a higher overall trend, closer to the MCL, and choose the month in which that contaminant is the highest. When there is a combination of surface water and groundwater utilized, data from the surface water should be used. If there are multiple surface water sources, then the source with the highest potential for DBP formation (or highest associated DBP levels), largest volume of water used or the warmest water temperature should be used.

The peak historical month may be identified using factors other than historical data and water temperature; however, the waterworks must provide adequate justification and should not choose a month in which the water temperature is colder than average. Other factors for consideration would include TOC levels and low water usage. Waterworks may want to consider a month which historically has high TOC levels and monitoring was not conducted. An example would be during the fall when water temperatures are still relatively warm and fallen leaves present a substantial organic loading. Waterworks may want to consider a month during which they show a documented decrease in water usage thus increasing the water age. For example, a waterworks with a seasonal population that peaks during the summer and drops off during the fall may have longer residence times when water temperatures are still relatively high.

Standard Monitoring Schedule

One round of sampling must occur during the identified peak historical month. The remaining sampling must be conducted at equal intervals (based on the required frequency) established before and after the peak historical month. Sampling may begin prior to the peak historical month depending on the waterworks compliance schedule. Waterworks are to identify in the SMP the date or week in which the samples will be collected. Sampling is not required to occur at the exact frequency of 60 or 90 days but must be conducted at equal intervals. Sampling within the same week during each required month is acceptable. For example, quarterly monitoring could occur during the third week of the third month. Waterworks do not have to sample all locations on the same day so long as scheduled monitoring is met. NOTE: The SMP is also to include the Stage 1 compliance monitoring schedule.

Distribution System Schematic

The distribution system schematic must include sources, entry point locations, storage facilities, standard monitoring sites and Stage 1 compliance monitoring sites. Other items to include would be pressure zone boundaries, pump stations and rechlorination facilities. SMPs are not considered confidential business information and are therefore subject to the Freedom of Information Act. Waterworks should not include information which poses a security risk. It is recommended that the schematic does not include landmarks or addresses; and if a city map is used, pipe locations are not on the map. It is permissible to meet to discuss information about

locations that could present a security risk, and then approve the SMP locations based on the meeting.

SYSTEM SPECIFIC STUDY

The system specific study plan is based on either existing TTHM and HAA5 data **or** hydraulic modeling. This working memo will address review of an SSS plan with existing data only. All SSS plans submitted based on hydraulic modeling will be handled as follows:

1. Waterworks will submit the SSS with hydraulic model and supporting data to the Field Office.
2. Field Office staff will review the SSS plan for completeness.
3. The SSS plan will then be forwarded to EPA Region 3 through the Central Office.
4. EPA will determine that the SSS plan with hydraulic modeling is technically adequate and will return it to ODW recommending approval.
5. The Field Office will then formally approve the SSS plan back to the owner with necessary copies to IPMC.

Waterworks submitting an SSS plan based on existing data may also submit the IDSE report at the same time if they have at least as much data as the minimum requirements and believe that the data provides good coverage of their system while adequately identifying high TTHM and HAA5 locations. This working memo will address only the SSS plan development, review and approval.

SSS Plan Required Elements

The SSS Plan must include the following elements:

- all Stage 1 and other DBP monitoring results for the specified time period,
- certification that the reported monitoring results included all compliance and noncompliance results for the specified time period,
- certification that the samples are representative of the entire system and that the treatment and distribution system have not changed significantly,
- peak historical month,
- population served and waterworks type (surface water, groundwater under the direct influence of surface water or groundwater),
- distribution system schematic showing sources, entry points, storage facilities with notes indicating the locations and dates of all completed and planned (if applicable) compliance and non-compliance monitoring.

Peak Historical Month

Follow guidance as stated for SMP.

Existing Data

All existing data must have been analyzed by an approved laboratory and collected within five years prior to the plan submittal deadline as shown in the following table:

Schedule	SSS Plan Deadline	Five Year Qualifying Period for Existing Monitoring Results
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1	October 1, 2006	October 1, 2001 – October 1, 2006
2	April 1, 2007	April 1, 2002 – April 1, 2007
3	October 1, 2007	October 1, 2002 – October 1, 2007
4	April 1, 2008	April 1 2003 – April 1, 2008

The required number of monitoring locations and total number of samples are as follows:

Source Water	Population Served	Number of Monitoring Locations	Number of Samples	
			TTHM	HAA5
Surface water or groundwater under the direct influence of surface water	<500	3	3	3
	500 - 3,300	3	9	9
	3,301 – 9,999	6	36	36
	10,000 – 49,000	12	72	72
	50,000 – 249,999	24	144	144
	250,000 – 999,999	36	216	216
	1,000,000 – 4,999,999	48	288	288
Groundwater	<500	3	3	3
	500 – 9,999	3	9	9
	10,000 – 99,000	12	48	48
	100,000 – 499,999	18	72	72
	≥500,000	24	96	96

Results submitted must include all Stage1 compliance results and all other operational TTHM and HAA5 data collected during the five year time period. This includes non-qualifying data (i.e., samples analyzed by a non-certified laboratory) or data not required to meet the minimum number of samples required. The waterworks must certify that no data has been omitted.

The data submitted are to reflect source water, treatment and overall distribution system hydraulic operation occurring at the time the SSS is completed. Temporary changes to disinfection practices occurring during the SSS data period are generally acceptable. Treatment changes that are unlikely to change DBP formation rate and relative levels of TTHM and HAA5 in the distribution system are also acceptable. If a permanent change occurred that would significantly affect DBP formation in the distribution system, then only the existing TTHM and HAA5 data which represented the conditions after the change should be used for the SSS. If the treatment process or source water changes have occurred and the data submitted are representative of conditions before the change, then the data must be justified by an explanation and demonstration showing that the change is unlikely to significantly influence the TTHM and HAA5 levels in the distribution system. VDH must accept the justification as part of the SSS review. If VDH does not accept the justification, then the affected data may not be used as part of the SSS, and will need to be replaced, unless sufficient existing data is presented to meet the minimum requirements.

Examples of changes that would not impact DBP formation would include:

- regular maintenance, rehabilitation and upgrades of plant processes
- short duration switches to free chlorine for secondary disinfection

- steady increase in water demand over time due to growth as long as it does not result in major changes to water flow pattern and water age.

Examples of permanent changes that would make the existing data unacceptable would include:

- addition of a booster chlorination
- addition of a new water source
- addition or removal of a very high water use customer
- addition, deletion or replacement of mains or storage tanks that significantly change water flow patterns
- large main looping projects significantly changing water flow
- plant production rates
- addition or removal of high service or booster pump stations
- pump operations schemes significantly changing location of treatment plant influence zones and mixing zones
- switch from free chlorine to chloramines as the residual disinfectant
- installation of advanced clarification or filtration processes.

SSS Monitoring Results

Waterworks must submit all Stage 1 compliance and all operational TTHM and HAA5 results generated during the specified time period covering the SSS. The EPA SSS plan form provides a fill-in-the-blank chart for listing each DBP monitoring site (indicating if it is a Stage 1 site), 12-month period, sample date and sample result. The 12-month period selected may be the calendar year, fiscal year or other 12-month period. It is recommended that multiple years of data be listed for each monitoring location before continuing on to the next monitoring location. Qualifying data must be analyzed by a certified laboratory using an approved method. For each sample location per 12-month period, the Locational Running Annual Average (LRAA) must be calculated.

There must be one dual sample result from the peak historical month for every 12 months of data submitted for each location. Waterworks may be given an opportunity to replace rejected data with additional SSS monitoring to meet the minimum requirements. Waterworks with significant existing data problems can be required to conduct standard monitoring.

Proposed SSS Monitoring Schedule

For waterworks that are still monitoring within the SSS specified period, they must list in a separate table from the existing data, their proposed sampling schedule. They are to include all Stage 1 DBP monitoring. The dates can be a specific date or week but at least one sample must be taken during the peak historical month for each 12 months of qualifying data.

Distribution System Schematic

The schematic must include the sources, entry points, storage facilities, Stage 1 compliance monitoring sites and monitoring sites for existing results. Other items to include would be pressure zone boundaries, pump stations and rechlorination facilities. SMPs are not considered confidential business information and are therefore subject to the Freedom of Information Act. Waterworks should not include information which poses a security risk. It is recommended that

the schematic not include landmarks or addresses; and if a city map is used, pipe locations not be included on the map.

CONSECUTIVE WATERWORKS AND WHOLESALE WATERWORKS

Consecutive waterworks should be encouraged to communicate with the wholesaler throughout the IDSE process. Items considered for discussion are as follows:

- When are the IDSE plans and reports due?
- What type of IDSE does the wholesale waterworks intend to complete? NOTE: Waterworks are not required to choose the same IDSE option.
- What stage in IDSE planning is the wholesale waterworks?
- During what month(s) does the wholesale waterworks intend to conduct DBP monitoring?
- Does the wholesale waterworks have water quality data (e.g., water temperature, DBP data, source water quality data, and operational data) that might be helpful to the consecutive waterworks?
- Would the wholesale waterworks be willing to exchange copies of draft IDSE plans?

Wholesale waterworks and consecutive waterworks are not required to select the same peak historical month as it may actually be different. If a consecutive waterworks has limited data from which to choose a peak historical month, they could reasonably assume that their peak historical month is the same as the month identified by the wholesaler. Consecutive waterworks should attempt to coordinate their IDSE monitoring with the wholesale waterworks. The data generated may be beneficial to both waterworks in understanding DBP formation and help them to formulate a Stage 2 compliance strategy.

REVIEW

Staff is to respond to waterworks within the normal SDWA report time frame (45 to 60 days). Note that while the Stage 2 rule states that plans which receive no comments are considered approved after 12 months, ODW does not want to use this clause.

It is recommended that plans for individual waterworks in a combined distribution system be reviewed together if possible to better understand the DBP formation and water flow throughout the CDS. Issues to consider are:

- Water flow between waterworks.
- Water age prior to the entry point.
- Did the waterworks sample in the same peak historical month?
- Have all key DBP issues been collectively addressed?

SM and SSS plan review forms can be found in Appendices D and E, respectively. An approval form letter is attached in Appendix F.

ORDERING AND RECORDING SAMPLE RESULTS

SDWIS and R&R may be used to record and order the results of the IDSE testing, however two methods will apply as follows:

1. If the IDSE sampling for the waterworks is “standard” (quarterly, or annually) then the Chem Schedules module of R&R may be used. The IDSE sites would be entered into SDWIS using the instructions found in Working Memo 823 and the kits ordered using “Chem Schedules” in R&R. ODW staff should identify the IDSE sites as “IDS01”, “IDS02”, etc. ODW staff must use caution in extracting these IDSE sample results using R&R so that they are not confused with the routine TTHM/HAA5 results that the waterworks is currently required to take.
2. If the IDSE for the waterworks is every 60 days, then ODW will have to order these samples through ad hoc in R&R. It is not feasible to program R&R to order the 60 day interval IDSE samples for the relative short period of time required by this rule. In order to use the ad hoc routine and to store the results in SDWIS/R&R, ODW staff will have to create sample sites in SDWIS using the following rules:
 - The IDSE sample sites will have to be entered into SDWIS and identified as "IDS01", "IDS02", etc.
 - The status of IDSE sample site will have to be shown as "proposed" in the active distribution system.
 - When ordering the kits through ad hoc the following selections will have to be made:
 1. Group – "TTHM/HAA5"
 2. Facility – "Distribution System"
 3. Sampling Point – Each IDSE site
 4. Compliance Sample – "Yes"
 5. Sample Type – "Special"
 6. Collection Date/Time – match with waterworks schedule
 - When results are received from DCLS, they will be entered into SDWIS/R&R but because they are linked to a "proposed" site, no chemical schedule will be created. Therefore each sample will have to be ordered through ad hoc.

If the results are received from a private lab, then they can be entered as described in WM823 but the results would be marked as "special" and "compliance", so that a schedule is not created in Chem Schedule.

The results can be viewed under Chem Schedules – SDWIS History or by using the Quick Look Tab.

END OF MEMO

Standard Monitoring Plan Form for Systems Serving < 10,000

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I. GENERAL INFORMATION

A. PWS Information*

B. Date Submitted* _____

PWSID: _____

PWS Name: _____

PWS Address: _____

City: _____ State: _____ Zip: _____

Population Served: _____

System Type:	Source Water Type:	Buying / Selling Relationships:
<input type="checkbox"/> CWS	<input type="checkbox"/> Subpart H	<input type="checkbox"/> Consecutive System
<input type="checkbox"/> NTNCWS	<input type="checkbox"/> Ground	<input type="checkbox"/> Wholesale System
		<input type="checkbox"/> Neither

C. PWS Operations

Residual Disinfectant Type: Chlorine Chloramines Other: _____

Number of Disinfected Sources: ___ Surface ___ GWUDI ___ Ground ___ Purchased

D. Contact Person*

Name: _____

Title: _____

Phone #: _____ Fax #: _____

E-mail: _____

II. IDSE REQUIREMENTS*

A. Number of Sites

B. Schedule

C. Standard Monitoring Frequency

Total: _____

Near Entry Point: _____

Avg Residence Time: _____

High TTHM: _____

High HAA5: _____

 Schedule 1 Schedule 2 Schedule 3 Schedule 4 During peak historical month
(1 monitoring period) Every 90 days (4 monitoring periods) Every 60 days (6 monitoring periods)

Standard Monitoring Plan Form for Systems Serving < 10,000

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V. PEAK HISTORICAL MONTH AND STANDARD MONITORING SCHEDULE (Continued)

D. Proposed Standard Monitoring Schedule*

Standard Monitoring Site ID (from map) ¹	Projected Sampling Date (date or week) ²			
	Period 1	Period 2	Period 3	Period 4

¹ Verify that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form).

² period = monitoring period. Complete for the number of periods from Section II.C. Can list exact date or week (e.g., week of 7/9/07)

VI. PLANNED STAGE 1 DBPR COMPLIANCE MONITORING SCHEDULE*

Stage 1 DBPR Monitoring Site ID (from map) ¹	Projected Sampling Date (date or week) ²			
	Period 1	Period 2	Period 3	Period 4

¹ Verify that site IDs match IDs on your distribution system schematic (See Section VII of this form).

² period = monitoring period. Complete for the number of periods in which you must conduct Stage 1 DBPR monitoring during IDSE monitoring. Can list exact date or week (e.g., week of 7/9/07)

Standard Monitoring Plan Form for Systems Serving < 10,000

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VII. DISTRIBUTION SYSTEM SCHEMATIC*

ATTACH a schematic of your distribution system.

Distribution system schematics are not confidential and should not contain information that poses a **security risk** to your system. EPA recommends that you use one of two options:

Option 1: Distribution system schematic with no landmarks or addresses indicated. Show locations of sources, entry points, storage facilities, standard monitoring locations, and Stage 1 compliance monitoring locations (required). Also include pressure zone boundaries and locations of pump stations. Provide map scale.

Option 2: City map without locations of pipes indicated. Show locations of sources, entry points, storage facilities, standard monitoring locations, and Stage 1 compliance monitoring locations (required). Also include boundaries of the distribution system, pressure zone boundaries and locations of pump stations. Provide map scale.

VIII. ATTACHMENTS

- Distribution System Schematic* (Section VII).
- Additional sheets for the summary of data or site justifications (Sections III and IV).
- Additional copies of Page 3 for justification of Standard Monitoring Sites (Section IV).
- Additional sheets for explaining how you used data other than TTHM, HAA5, and temperature data to select your peak historical month (Section V).
- Additional sheets for planned Stage 1 DBPR compliance monitoring schedule (Section VI).

Total Number of Pages in Your Plan _____

Note: Fields with an asterisk (*) are required by the Stage 2 DBPR

Standard Monitoring Plan														
		Page 1 of 6												
I. GENERAL INFORMATION														
A. PWS Information*	B. Date Submitted* _____													
PWSID: _____ PWS Name: _____ PWS Address: _____ City: _____ State: _____ Zip: _____ Population Served: _____														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; padding: 5px;">System Type:</td> <td style="width: 33%; padding: 5px;">Source Water Type:</td> <td style="width: 33%; padding: 5px;">Buying / Selling Relationships:</td> </tr> <tr> <td style="padding: 5px;"><input type="checkbox"/> CWS</td> <td style="padding: 5px;"><input type="checkbox"/> Subpart H</td> <td style="padding: 5px;"><input type="checkbox"/> Consecutive System</td> </tr> <tr> <td style="padding: 5px;"><input type="checkbox"/> NTNCWS</td> <td style="padding: 5px;"><input type="checkbox"/> Ground</td> <td style="padding: 5px;"><input type="checkbox"/> Wholesale System</td> </tr> <tr> <td></td> <td></td> <td style="padding: 5px;"><input type="checkbox"/> Neither</td> </tr> </table>	System Type:	Source Water Type:	Buying / Selling Relationships:	<input type="checkbox"/> CWS	<input type="checkbox"/> Subpart H	<input type="checkbox"/> Consecutive System	<input type="checkbox"/> NTNCWS	<input type="checkbox"/> Ground	<input type="checkbox"/> Wholesale System			<input type="checkbox"/> Neither		
System Type:	Source Water Type:	Buying / Selling Relationships:												
<input type="checkbox"/> CWS	<input type="checkbox"/> Subpart H	<input type="checkbox"/> Consecutive System												
<input type="checkbox"/> NTNCWS	<input type="checkbox"/> Ground	<input type="checkbox"/> Wholesale System												
		<input type="checkbox"/> Neither												
C. PWS Operations														
Residual Disinfectant Type: <input type="checkbox"/> Chlorine <input type="checkbox"/> Chloramines <input type="checkbox"/> Other: _____ Number of Disinfected Sources: ___ Surface ___ GWUDI ___ Ground ___ Purchased														
D. Contact Person*														
Name: _____ Title: _____ Phone #: _____ Fax #: _____ E-mail: _____														
II. IDSE REQUIREMENTS*														
A. Number of Sites	B. Schedule	C. Standard Monitoring Frequency												
Total: _____ Near Entry Point: _____ Avg Residence Time: _____ High TTHM: _____ High HAA5: _____	<input type="checkbox"/> Schedule 1 <input type="checkbox"/> Schedule 2 <input type="checkbox"/> Schedule 3 <input type="checkbox"/> Schedule 4	<input type="checkbox"/> During peak historical month (1 monitoring period) <input type="checkbox"/> Every 90 days (4 monitoring periods) <input type="checkbox"/> Every 60 days (6 monitoring periods)												

Standard Monitoring Plan Page 2 of 6

III. SELECTING STANDARD MONITORING SITES

A. Data Evaluated Put a "✓" in each box corresponding to the data that you used to select each type of standard monitoring site. Check all that apply.

Data Type	Type of Site			
	Near Entry Pt.	Avg. Residence Time	High TTHM	High HAA5
System Configuration				
Pipe layout, locations of storage facilities				
Locations of sources and consecutive system entry points				
Pressure zones				
Information on population density				
Locations of large customers				
Water Quality and Operational Data				
Disinfectant residual data				
Stage 1 DBP data				
Other DBP data				
Microbiological monitoring data (e.g., HPC)				
Tank level data, pump run times				
Customer billing records				
Advanced Tools				
Water distribution system model				
Tracer study				

B. Summary of Data* Provide a summary of data you relied on to justify standard monitoring site selection. (*attach additional sheets if needed*)

Standard Monitoring Plan		Page 3 of 6
IV. JUSTIFICATION OF STANDARD MONITORING SITES*		
Standard Monitoring Site ID (from map)¹	Site Type	Justification
	<input type="checkbox"/> Near Entry Pt <input type="checkbox"/> Avg. Res. Time <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5	
	<input type="checkbox"/> Near Entry Pt <input type="checkbox"/> Avg. Res. Time <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5	
	<input type="checkbox"/> Near Entry Pt <input type="checkbox"/> Avg. Res. Time <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5	
	<input type="checkbox"/> Near Entry Pt <input type="checkbox"/> Avg. Res. Time <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5	
	<input type="checkbox"/> Near Entry Pt <input type="checkbox"/> Avg. Res. Time <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5	
	<input type="checkbox"/> Near Entry Pt <input type="checkbox"/> Avg. Res. Time <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5	
	<input type="checkbox"/> Near Entry Pt <input type="checkbox"/> Avg. Res. Time <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5	
	<input type="checkbox"/> Near Entry Pt <input type="checkbox"/> Avg. Res. Time <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5	
	<input type="checkbox"/> Near Entry Pt <input type="checkbox"/> Avg. Res. Time <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5	

¹ Verify that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 8 standard monitoring locations or need more room.

Standard Monitoring Plan Page 4 of 6

V. PEAK HISTORICAL MONTH AND PROPOSED STANDARD MONITORING SCHEDULE

A. Peak Historical Month* _____

B. If Multiple Sources, Source Used to Determine Peak Historical Month
(write "N/A" if only one source in your system)

C. Peak Historical Month Based On* (check all that apply)

- High TTHM Warmest water temperature
 High HAA5

If you used other information to select your peak historical month, explain here
(attach additional sheets if needed)

D. Proposed Standard Monitoring Schedule*

Standard Monitoring Site ID (from map) ¹	Projected Sampling Date (date or week) ²					
	period 1	period 2	period 3	period 4	period 5	period 6

¹ Verify that site IDs match IDs in Section IV and on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to select more than 8 standard monitoring locations.

² period = monitoring period. Complete for the number of periods from Section II.C. Can list exact date or week (e.g., week of 7/9/07)

Standard Monitoring Plan		Page 5 of 6		
VI. PLANNED STAGE 1 DBPR COMPLIANCE MONITORING SCHEDULE*				
Stage 1 DBPR Monitoring Site ID (from map) ¹	Projected Sampling Date (date or week) ²			
	Period 1	Period 2	Period 3	Period 4

¹ Verify that site IDs match IDs on your distribution system schematic (See Section VII of this form). Attach additional copies if you are required to monitor at more than 8 Stage 1 DBPR sites.

² period = monitoring period. Complete for the number of periods in which you must conduct Stage 1 DBPR monitoring during IDSE monitoring. Can list exact date or week (e.g., week of 7/9/07)

| **VII. DISTRIBUTION SYSTEM SCHEMATIC*** | | | | |
| **ATTACH a schematic of your distribution system.** Distribution system schematics are not confidential and should not contain information that poses a **security risk** to your system. EPA recommends that you use one of two options: **Option 1: Distribution system schematic with no landmarks or addresses indicated.** Show locations of sources, entry points, storage facilities, standard monitoring locations, and Stage 1 compliance monitoring locations (required). Also include pressure zone boundaries and locations of pump stations. Provide map scale. **Option 2: City map without locations of pipes indicated.** Show locations of sources, entry points, storage facilities, standard monitoring locations, and Stage 1 compliance monitoring locations (required). Also include boundaries of the distribution system, pressure zone boundaries and locations of pump stations. Provide map scale. | | | | |

Standard Monitoring Plan		Page 6 of 6
VIII. ATTACHMENTS		
<ul style="list-style-type: none"><input type="checkbox"/> Distribution System Schematic* (Section VII).<input type="checkbox"/> Additional sheets for the summary of data or site justifications (Sections III and IV).<input type="checkbox"/> Additional copies of Page 3 for justification of Standard Monitoring Sites (Section IV). Required if you are a subpart H system serving more than 49,999 people or a ground water system serving more than 499,999 people.<input type="checkbox"/> Additional sheets for explaining how you used data other than TTHM, HAA5, and temperature data to select your peak historical month (Section V).<input type="checkbox"/> Additional copies of Page 4 for proposed monitoring schedule (Section V). Required if you are a subpart H system serving more than 49,999 people or a ground water system serving more than 499,999 people.<input type="checkbox"/> Additional sheets for planned Stage 1 DBPR compliance monitoring schedule (Section VI).		
Total Number of Pages in Your Plan _____		

Note: Fields with an asterisk (*) are required by the Stage 2 DBPR

Existing Monitoring Results SSS Plan Page 1 of 8				
I. GENERAL INFORMATION				
A. PWS Information* PWSID: _____ PWS Name: _____ PWS Address: _____ City: _____ State: _____ Zip: _____ Population Served: _____	B. Date Submitted* _____			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; padding: 5px;"> System Type: <input type="checkbox"/> CWS <input type="checkbox"/> NTNCWS </td> <td style="width: 33%; padding: 5px;"> Source Water Type: <input type="checkbox"/> Subpart H <input type="checkbox"/> Ground </td> <td style="width: 33%; padding: 5px;"> Buying / Selling Relationships: <input type="checkbox"/> Consecutive System <input type="checkbox"/> Wholesale System <input type="checkbox"/> Neither </td> </tr> </table>		System Type: <input type="checkbox"/> CWS <input type="checkbox"/> NTNCWS	Source Water Type: <input type="checkbox"/> Subpart H <input type="checkbox"/> Ground	Buying / Selling Relationships: <input type="checkbox"/> Consecutive System <input type="checkbox"/> Wholesale System <input type="checkbox"/> Neither
System Type: <input type="checkbox"/> CWS <input type="checkbox"/> NTNCWS	Source Water Type: <input type="checkbox"/> Subpart H <input type="checkbox"/> Ground	Buying / Selling Relationships: <input type="checkbox"/> Consecutive System <input type="checkbox"/> Wholesale System <input type="checkbox"/> Neither		
C. PWS Operations Residual Disinfectant Type: <input type="checkbox"/> Chlorine <input type="checkbox"/> Chloramines <input type="checkbox"/> Other _____ Number of Disinfected Sources: ___ Surface ___ GWUDI ___ Ground ___ Purchased				
D. Contact Person* Name: _____ Title: _____ Phone #: _____ Fax #: _____ E-mail: _____				
II. SSS REQUIREMENTS*				
A. Minimum Number of Monitoring Locations _____				
B. Minimum Number of Required Samples _____ TTHM _____ HAA5				
C. IDSE Schedule <input type="checkbox"/> Schedule 1 <input type="checkbox"/> Schedule 2 <input type="checkbox"/> Schedule 3 <input type="checkbox"/> Schedule 4				

Existing Monitoring Results SSS Plan Page 2 of 8											
III. PEAK HISTORICAL MONTH											
<p>A. Peak Historical Month* _____</p> <p>B. If Multiple Sources, Source Used to Determine Peak Historical Month (write "N/A" if only one source in your system)</p> <p>_____</p> <p>C. Peak Historical Month Based On (check as many as needed)</p> <p> <input type="checkbox"/> High TTHM <input type="checkbox"/> High HAA5 <input type="checkbox"/> Warmest Water temperature </p> <p>If you used other information to select your peak historical month, explain here (attach additional sheets if needed)</p> <p>_____</p> <p>_____</p> <p>_____</p>											
IV. PREVIOUSLY COLLECTED MONITORING RESULTS*											
<p>A. Where were your TTHM and HAA5 samples analyzed?</p> <p> <input type="checkbox"/> In-House Is your in-house laboratory certified? <input type="checkbox"/> Yes <input type="checkbox"/> No </p> <p> <input type="checkbox"/> Certified Laboratory Name of certified laboratory: _____ </p>											
<p>B. What method(s) was used to analyze your TTHM and HAA5 samples?</p> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left; width: 50%;">TTHM</th> <th style="text-align: left; width: 50%;">HAA5</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> EPA 502.2</td> <td><input type="checkbox"/> EPA 552.1</td> </tr> <tr> <td><input type="checkbox"/> EPA 524.3</td> <td><input type="checkbox"/> EPA 552.2</td> </tr> <tr> <td><input type="checkbox"/> EPA 551.1</td> <td><input type="checkbox"/> EPA 552.3</td> </tr> <tr> <td></td> <td><input type="checkbox"/> SM 6251 B</td> </tr> </tbody> </table>		TTHM	HAA5	<input type="checkbox"/> EPA 502.2	<input type="checkbox"/> EPA 552.1	<input type="checkbox"/> EPA 524.3	<input type="checkbox"/> EPA 552.2	<input type="checkbox"/> EPA 551.1	<input type="checkbox"/> EPA 552.3		<input type="checkbox"/> SM 6251 B
TTHM	HAA5										
<input type="checkbox"/> EPA 502.2	<input type="checkbox"/> EPA 552.1										
<input type="checkbox"/> EPA 524.3	<input type="checkbox"/> EPA 552.2										
<input type="checkbox"/> EPA 551.1	<input type="checkbox"/> EPA 552.3										
	<input type="checkbox"/> SM 6251 B										

Existing Monitoring Results SSS Plan

Page 3 of 8

IV. PREVIOUSLY COLLECTED MONITORING RESULTS (continued)*

C. TTHM Results

Site ID ¹	12-month period	Data Qualifies (yes/no)	Data Type	TTHM (mg/L)						LRAA
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							

¹ Verify that site IDs match the site IDs on your distribution system schematic.

Attach additional sheets as needed for previously collected compliance and operational monitoring results.

Existing Monitoring Results SSS Plan										
IV. PREVIOUSLY COLLECTED MONITORING RESULTS (continued)*										
C. TTHM Results										
Site ID ¹	12-month period	Data Qualifies (yes/no)	Data Type	TTHM (mg/L)						LRAA
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							

¹ Verify that site IDs match the site IDs on your distribution system schematic.

Attach additional sheets as needed for previously collected compliance and operational monitoring results.

Existing Monitoring Results SSS Plan								Page 5 of 8	
IV. PREVIOUSLY COLLECTED MONITORING RESULTS (continued)*									
D. HAA5 Results									
Site ID ¹	12-month period	Data Qualifies (yes/no)	Data Type	HAA5 (mg/L)					LRAA
			Sample Date						
			Sample Result						
			Sample Date						
			Sample Result						
			Sample Date						
			Sample Result						
			Sample Date						
			Sample Result						
			Sample Date						
			Sample Result						

¹ Verify that site IDs match the site IDs on your distribution system schematic.

Attach additional sheets as needed for previously collected compliance and operational monitoring results.

Existing Monitoring Results SSS Plan										Page 6 of 8
IV. PREVIOUSLY COLLECTED MONITORING RESULTS (continued)*										
D. HAA5 Results										
Site ID ¹	12-month period	Data Qualifies (yes/no)	Data Type	HAA5 (mg/L)						LRAA
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							
			Sample Date							
			Sample Result							

¹ Verify that site IDs match the site IDs on your distribution system schematic.
Attach additional sheets as needed for previously collected compliance and operational monitoring results.

Existing Monitoring Results SSS Plan Page 7 of 8

V. CERTIFICATION OF DATA*

I hereby certify that:

- The reported monitoring results include all compliance and non-compliance results generated during the time period beginning with the first reported result and ending with the most recent Stage 1 DBPR results.
- The samples are representative of the entire distribution system.
- Treatment and the distribution system have not changed significantly since the samples were collected.

Signature: _____

Date: _____

VI. PROPOSED SSS MONITORING SCHEDULE*

Skip if you are submitting your IDSE Report at the same time as your plan

SSS Site ID (from map) ¹	Projected Sampling Date (date or week) ²					
	period 1	period 2	period 3	period 4	period 5	period 6

¹ Verify that site IDs match IDs on your distribution system schematic (See Section VII of this form). Attach additional copies of this sheet if necessary.

² period = monitoring period. Can list exact date or week (e.g., week of 7/9/07)

Existing Monitoring Results SSS Plan Page 8 of 8**VII. DISTRIBUTION SYSTEM SCHEMATIC***

ATTACH a schematic of your distribution system.

Distribution system schematics are not confidential and should not contain information that poses a **security risk** to your system. EPA recommends that you use one of two options:

Option 1: Distribution system schematic with no landmarks or addresses indicated. Show locations of sources, entry points, storage facilities, operational monitoring locations, and Stage 1 compliance monitoring locations (required). Also include pressure zone boundaries and locations of pump stations. Provide map scale.

Option 2: City map without locations of pipes indicated. Show locations of sources, entry points, storage facilities, operational monitoring locations, and Stage 1 compliance monitoring locations (required). Also include boundaries of the distribution system, pressure zone boundaries and locations of pump stations. Provide map scale.

VIII. ATTACHMENTS

- Additional sheets for explaining how you selected the peak historical month (Section III).
- Additional sheets for previously collected monitoring results (Section IV).
- Additional sheets for proposed monitoring dates (Section VI).
- Distribution system schematic* (Section VII).

Total Number of Pages in Your Plan: _____

Note: Fields with an asterisk (*) are required by the Stage 2 DBPR.

Examine Disinfectant Residual Data

You can identify approximate average residence time locations in the distribution system by calculating the **average disinfectant residual concentration** and identifying sites with residual concentrations near the average. When calculating average disinfectant residual, it is important to use data from sites that are representative of the entire distribution system. One way to do this is by examining disinfectant residual data collected at TCR monitoring sites. These data should be useful since the TCR requires that monitoring sites represent water throughout the distribution system. Note that if there is booster disinfection, then residual data collected after those locations will skew this analysis and that data should be omitted. See the guidelines below for using disinfectant residual data. If it is believed that the residual data correlates well with water age, use the following analysis to help identify sites with average residence time:

- 1) Calculate an average disinfectant residual at each of the TCR sites using data from the months with the warmest water temperatures. Chlorine decay is more pronounced in warmer temperatures so it is more common to see larger changes in chlorine residual from one point to the next.
- 2) Using averages from the individual sites, calculate an overall average distribution system residual concentration.
- 3) Those sites with an average residual close to the distribution system average can be considered representative of average residence time in the distribution system. Select sites in areas with high population densities with disinfectant residuals close to the system average.

Caution for waterworks using chloramines

Chloramines are generally more stable than chlorine and may result in only small measured differences throughout the distribution system. In this case, the method described above may not be effective for locating average residence time sites because the change in disinfectant residual concentration is not significant.

Guidelines for Using Disinfectant Residual Data

When should I use disinfectant residual data?

Disinfectant residual in the distribution system generally decays as water age increases. Residual concentrations typically decay faster in the warmer months, and the magnitude of decay is more pronounced for free chlorine residuals compared to chloramine residuals. Disinfectant residual can be helpful in locating areas of average and maximum residence time in the distribution system. This information can be used to select candidate average residence time, high TTHM, and high HAA5 sites. Because disinfectant residual decay can be caused by factors other than residence time, you should be careful when interpreting your data. Other reasons why you might see a loss in disinfectant residual are listed below;

- Certain types of pipe material can exert a disinfectant residual demand. In particular, unlined cast iron pipe can cause residuals to decline.
- Residual decline can be caused by corrosion byproducts and sediment. Customer complaints may indicate that these are occurring in your distribution system.

- Bacteriological activity can result in a significant depletion of disinfectant residual. HPC data is useful for determining whether this is a concern in your distribution system.

What are the sources of disinfectant residual data?

Residual data can be from TCR sites, Stage 1 sites, operational sample sites, or sites sampled following customer complaints.

Which data should I use to help identify candidate average residence time sites?

If you are using residual data to help identify sites with average water age, make sure that data is from locations distributed throughout the distribution system. You may want to use only data from TCR sites, since these sites should be geographically representative of your waterworks. Make sure you don't over emphasize a particular area. You should also use data from the warmest months that show the biggest differences in residual levels.

What if I don't have residual data throughout the distribution system?

You may wish to take more residual data. Take care to ensure that the data is comparable in terms of analytical method, distribution system configuration, and time of the year to the data to which it will be compared.

Average Disinfectant Residual Calculation

A waterworks with June, July, and August as its warmest months has free chlorine residual data at 10 sites. The residual concentrations are recorded below, and the averages for each site and the waterworks as a whole are calculated as shown. Note that sites #2, #3, and #9 have average chlorine residual concentrations close to the distribution system average. These sites are good candidate average residence time sites.

Site ID	Monthly Average (mg/l)			Site Average (mg/l)
	June	July	August	
#1	1.4	1.3	1.6	1.4
#2	0.7	0.9	0.7	0.8
#3	1.0	0.9	1.2	1.0
#4	0.6	0.6	0.7	0.6
#5	0.9	1.2	1.4	1.2
#6	0.4	0.5	0.4	0.4
#7	0.2	0.3	0.6	0.4
#8	1.5	1.7	1.7	1.6
#9	0.9	0.7	0.8	0.8
#10	0.5	0.3	0.8	0.5
Distribution System Average	0.8	0.8	1.0	0.9

Use Billing Records and a Map or Schematic

Billing records and information on population density, together with a map of the distribution system, can be used to rule out locations for average residence time sites. Examine the customer billing records to determine where the large customers are located. The portions of the distribution system serving large water users will likely have low water age and will not be good

candidate sites for average residence time. The portions of the distribution system that are sparsely populated will likely have high water age and will also not be good candidates for average residence times. Consider the locations of storage tanks and the sizes of distribution system mains to the extent possible. If the waterworks does not have any large individual customers, consider locating the candidate sites in moderately developed areas in the approximate geographic center of the distribution system.

STANDARD MONITORING PLAN REVIEW SHEET
(Includes <10,000)

City / County _____

Waterworks _____

PWSID # _____

Part of a CDS Yes No

Reviewed as part of a CDS Yes No

Reviewed By: _____

	Date
SMP Received	
Reviewed	
Modifications Requested	
Revisions Received	
Approved	

I. GENERAL INFORMATION		COMMENT
PWS information complete	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Date submitted filled in	<input type="checkbox"/> Yes <input type="checkbox"/> No	
PWS operations correct	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Contact person complete	<input type="checkbox"/> Yes <input type="checkbox"/> No	
II. IDSE REQUIREMENTS		
Population used to determine schedule	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____ Persons
Waterworks schedule (satisfactory, what is it)	<input type="checkbox"/> Yes <input type="checkbox"/> No	Schedule _____
Plan received by due date	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date due _____
Sufficient number and type of Sample Sites	<input type="checkbox"/> Yes <input type="checkbox"/> No	Total Sites = _____
Correct monitoring frequency	<input type="checkbox"/> Yes <input type="checkbox"/> No	Every _____ months
Sample dates adequately identified.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
III. SITE SELECTION		
Data used for site justification indicated	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Adequate summary of data justification (includes sources, type of data available, disinfectant residual concentrations, distribution system operations)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
IV. SITE SELECTION AND JUSTIFICATION		
Near Entry Point		
-Sufficient number of sites listed	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-If no, used entry point with highest flow; or, unused sites transferred to high TTHM/HAA5 sites	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Located no later than first customer	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Adequate justification provided (key site characteristics listed)	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Average Residence Time		
-Sufficient number of sites listed	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Site selected in each pressure zone (if applicable)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Site selected in area influenced by each source (if applicable)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Complexity of distribution system considered	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Adequate justification provided (key site characteristics listed)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
High TTHM		
-Sufficient number of sites listed	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Sites are representative of long residence time	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Adequate justification provided (key site characteristics listed)	<input type="checkbox"/> Yes <input type="checkbox"/> No	

High HAA5		
-Sufficient number of sites listed	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-HAA5 degradation considered in site selection	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Adequate justification provided (key site characteristics listed)	<input type="checkbox"/> Yes <input type="checkbox"/> No	

V. PEAK HISTORICAL MONTH and MONITORING SCHEDULE

Peak month identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Source used to determine (if multiple sources)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Determination was based on DBP levels or water temperature	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Summary of data (if other than historical DBP or water temperature)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
All monitoring sites are listed for scheduled sampling	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Correct sampling frequency used	<input type="checkbox"/> Yes <input type="checkbox"/> No	
One round of sampling (per site) takes place during peak historical month	<input type="checkbox"/> Yes <input type="checkbox"/> No	

VI. STAGE 1 COMPLIANCE SCHEDULE

All Stage 1 sites listed	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Correct sampling frequency used	<input type="checkbox"/> Yes <input type="checkbox"/> No	

VII. DISTRIBUTION SYSTEM SCHEMATIC		
Following items identified on map:		
- all sources	<input type="checkbox"/> Yes <input type="checkbox"/> No	
- all entry points	<input type="checkbox"/> Yes <input type="checkbox"/> No	
- all storage facilities	<input type="checkbox"/> Yes <input type="checkbox"/> No	
- all standard monitoring locations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
- all Stage 1 compliance monitoring locations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
- pressure zone boundaries identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	
- booster pump stations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
- rechlorination facilities	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sites provide good geographic representation	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sites provide good hydraulic representation	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Key distribution system areas covered		
-down gradient of storage tanks	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-long dead end lines	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-areas with low disinfectant residual concentrations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-areas influenced by rechlorination	<input type="checkbox"/> Yes <input type="checkbox"/> No	
VIII. ATTACHMENTS		
All attachments indicated	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Attachments included	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Appendix E

SYSTEM SPECIFIC STUDY (EXISTING MONITORING) PLAN
REVIEW SHEET

City / County _____

Waterworks _____

PWSID # _____

Part of a CDS Yes No

Reviewed as part of a CDS Yes No

Reviewed By: _____

	Date
SSS Received	
Reviewed	
Modifications Requested	
Revisions Received	
Approved	

I. GENERAL INFORMATION		COMMENT
PWS information complete	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Date submitted filled in	<input type="checkbox"/> Yes <input type="checkbox"/> No	
PWS operations correct	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Contact person complete	<input type="checkbox"/> Yes <input type="checkbox"/> No	
II. SSS REQUIREMENTS		
Sufficient number of monitoring locations	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sufficient number of required TTHM & HAA5 samples	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Correct schedule	<input type="checkbox"/> Yes <input type="checkbox"/> No	
III. PEAK HISTORICAL MONTH		
Peak month identified	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Source used to determine (if multiple sources)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Determination was based on DBP levels or water temperature	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Summary of data (if other than historical DBP or water temperature)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
IV. PREVIOUSLY COLLECTED MONITORING RESULTS		
Certified laboratory used	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Analysis methods indicated	<input type="checkbox"/> Yes <input type="checkbox"/> No	
TTHM results	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-All results listed	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-12 month period indicated	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Indicated whether or not sample meets qualifying data	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Sample date and result provided for each site during each monitoring period	<input type="checkbox"/> Yes <input type="checkbox"/> No	
-Locational running annual average calculated for each site	<input type="checkbox"/> Yes <input type="checkbox"/> No	

-Sample collected during peak historical month for every 12 months of data	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
HAA5 results	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
-All results listed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
-12 month period indicated	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
-Indicated whether or not sample meets qualifying data	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
-Sample date and result provided for each site during each monitoring period	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
-Locational running annual average calculated for each site	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
-Sample collected during peak historical month for every 12 months of data	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
V. CERTIFICATION OF DATA			
Certification signed and dated	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
VI. PROPOSED SSS MONITORING SCHEDULE (if applicable)			
All SSS monitoring sites are listed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Correct SSS sampling frequency used	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
All Stage 1 sites are listed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Correct sampling frequency for Stage 1 sites used	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
One round of sampling (per site) takes place during peak historical month	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
VII. DISTRIBUTION SYSTEM SCHEMATIC			
Following items identified on map:			
- all sources	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- all entry points	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- all storage facilities	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- all standard monitoring locations	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- all Stage 1 compliance monitoring locations	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- pressure zone boundaries identified	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- booster pump stations	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
- rechlorination facilities	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Sites provide good geographic representation	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Sites provide good hydraulic representation	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Key distribution system areas covered			
-down gradient of storage tanks	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
-long dead end lines	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
-areas with low disinfectant residual concentrations	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
-areas influenced by rechlorination	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
VIII. ATTACHMENTS			
All attachments indicated	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Attachments included	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Appendix F

SUBJECT: (City or County)
Water - (Waterworks Name)
PWSID No. _____

Waterworks Owner Name
Address 1
Address 2
City/Town, VA ZIP Code

Dear _____:

We have received the proposed Stage 2 Disinfectants and Disinfection Byproducts Rule Standard Monitoring Plan [System Specific Study Plan for Existing Data) (System Specific Study Plan with Hydraulic Model) for the subject waterworks dated _____. This is to advise that the proposed Standard Monitoring Plan (System Specific Study) has been found by the Virginia Department of Health to meet the requirements of §§ 141.601 [§§ 141.602] of the National Primary Drinking Water Regulations, and is hereby provisionally approved.

Please remember that you must complete the standard monitoring (system specific study) by September 30, 2008 (March 31, 2009, September 30, 2009, March 31 2010) and submit the Initial Distribution System Evaluation report to this office for review and approval by January 1, 2009 (July 1, 2009, January 1, 2010, July 1, 2010).

If you have any questions regard the above, please do not hesitate to call _____, District Engineer.

Sincerely,

Name
Engineering Field Director

cc: VDH – Central Office – ATTN: Steve Pellei
_____ Health Department
U.S. EPA – Information Processing and Management Center